

**Missouri Department of Natural Resources**  
**Integrated Strategic Plan**  
**December 15, 2005**



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# The Department's Strategic Goals

The Department of Natural Resources strives to protect, preserve and enhance Missouri's natural, cultural and energy resources.

We seek to address this mission proactively, identifying issues and problems early before they become major crisis. We will encourage participation from stakeholders, communities, businesses and the public in this process.

## Water

**Many challenging and encompassing issues facing Missouri's environment deal with water. These will affect our lives, our economy and the state's ability to prosper in the future.**

- > Assure needed water flow in the Missouri River
- > Provide an adequate supply of high quality water. Regional water supply issues especially in southwest Missouri affecting water quality and quantity. The southwest Missouri watershed affected includes Arkansas and Oklahoma. In northwest Missouri water issues center on the quantity of drinking water.
- > Upgrade water management facilities in major metropolitan areas, specifically handling strained sewer systems
- > Implement updated water quality standards to comply with federal law
- > Upgrade an aging wastewater and drinking water infrastructure that has limited financial resources to correct the problem.

## Land resources

**Protection and enhancement of productivity takes many forms.**

- > Continue efforts to control soil erosion through funds provided by renewal of the Parks and Soils Sales Tax
- > Redevelop communities through brownfield cleanups
- > Revitalize and bolster our cities through historic preservation
- > Provide long term stewardship for major sites contaminated by hazardous wastes such as Weldon Spring

## Air quality

**Improve St. Louis and Kansas City regional air quality to increase air quality for nearly one half of Missouri's population.**

## Energy

**Missouri needs a long term energy policy that takes into consideration impacts to the environment.**

- > Increase reliance on renewable fuels such as ethanol and biodiesel
- > Bring innovative and environmentally protective energy production to Missouri

## Protecting and enhancing our State Parks and Historic Sites

- > Provide quality statewide recreation in concert with natural and cultural preservation
- > Renew the Parks and Soils Sales Tax

# The Department's Operational Goals

These issues affect all Missourians. How we provide service to address these issues is directly related to how the department operates. Movement from reactive solutions to proactive steps will help us address issues earlier, and hopefully with less cost and effort. Constant improvement in our processes with an emphasis on cooperative efforts will allow the department to more effectively address both the difficult issues and our everyday work. Building bridges with the agricultural community and the tourism industry also rank high on the department's list of priorities.

The department has several initiatives. Those initiatives, their impact and results:

## **Initial assistance visits**

An initial visit is offered to newly permitted facilities or those that have never been inspected

Going over permit requirement early in the process will increase understanding. This is also an opportunity to provide assistance and guidance to improve compliance with requirements.

## **Improved environmental quality**

## **Automation of permitting processes**

Developing the ability to both complete a permit application electronically, and automation of the information flow from the permittee to the department.

By increasing the speed and ease of application for the most frequently issued permits or the simplest will free up staff time to offer more assistance.

## **Improved environmental quality**

## **Ombudsmen**

Staff have been located throughout Missouri to listen and seek means to resolve issues.

These efforts will increase problem resolution and communication between Missourians and the department.

## **Improved service and problem resolution**

## **Rolled up budget**

Much of the FY2007 budget proposal had large organizational units combined into larger budget items rather than many separate items.

This "rolling up" will allow for flexibility to move funds and resources to priority needs.

## **Breaking down silos within the department to enhance service**

# Governor's Goals for the Department of Natural Resources

Governor Blunt knows our natural treasures deserve the very best care we can give. He provides leadership necessary to protect our natural resources so our children and grandchildren can enjoy them for years to come. All these goals are further addressed throughout the strategic plan.

I will lead the fight against changes in Missouri River Master Manual that are detrimental to agriculture. I will adamantly oppose any measure that significantly restricts the quantity of water flowing into our state. I will ask the departments to cooperate on this issue. I will work with the COE for the expansion and improvement of the lock system on the upper Mississippi River

I will help lead the fight against changes in the Missouri River Manual that are detrimental to our economy.

DNR will be directed to enhance and protect our natural, cultural and energy resources while demonstrating true and sincere openness to differing points of view.

It is essential that we undertake this next round of air quality control measures and emission reductions with the full input of all stakeholders in order to ensure public acceptance and effective implementation.

I will petition the EPA to allow RFG augmented by a 10% ethanol additive made from corn to be used throughout the state.

I will encourage DNR and the public to work together to revolve problems and to use innovative methods to protect water quality.

I will see that the process for accessing the Water and Wastewater State Revolving Loan fund is streamlined and easier to access.

Permit decisions should be made quickly with prompt notification to the applying party.

I will work to repair the perceived rift between DNR and the public. Legislation that ensures DNR's regulations are based on sound science and that the economic benefits outweigh the costs is a positive step.

The person appointed to lead DNR will work closely with other agencies.

We should liaise with Arkansas on water quality.





## Clean, safe and abundant water

Water quality decisions we make in Missouri not only enhance our ability to fully enjoy our water, but such improvements can make their way all the way down to the Gulf of Mexico. Earth is a water planet, and thousands of pollution sources can impair our water quality and dictate far-reaching consequences for all Missourians, as well as our neighbors. There is a great deal of overlap between the risks that pose a threat to our land and those that pose a threat to our water.

The Department of Natural Resources works to protect water quality and availability including preventing pollution from impairing our rivers, lakes and streams and our water supply; reducing soil erosion; and engaging other states and the federal government to maintain Missouri's future beneficial uses of interstate waters.

### Missouri and Mississippi Rivers

Number of Missourians served by protecting the quantity of water in the Missouri River for water supply purposes				
	2002	2003	2004	2005
Individuals using the Missouri River for drinking water	1,904,154	1,943,721	1,983,289	2,423,105
Note: Other benefits of the program's work to ensure that the Missouri River has adequate flow include: recreation, agriculture (irrigation and livestock), flood control, fish and wildlife, water commerce, and industrial usage. Approximately 50% of Missouri's population rely on water in the Missouri River as a source of drinking water.				

Missouri occupies a watershed in America's greatest river system, the Mississippi River and its tributaries. The Mississippi, the Missouri and the White rivers bring into the state tremendous amounts of water providing countless benefits. The water in these rivers must be shared with 19 other states. Missouri is both an upstream as well as a downstream state, which conveys great privilege and heavy responsibility.

As a downstream state we vigorously defend our right to use a fair share of water that flows into Missouri or along its borders. This resource provides nearly half of the state's drinking water, , serves as a mode of transportation for agricultural commoditie, supplies cooling water for many of the state's utiliessi, and provides recreation and tourism opportunities for Missouri citizens. However, massive water diversions that are being developed in upstream states, such as the Garrison Diversion in North Dakota, could divert water out of the Missouri River basin, diminishing the amount of water available for our use.

The Department of Natural Resources supports the protection of endangered species and the natural habitat along the Missouri River; however, we believe that there are effective, common sense ways to protect the species without adversely affecting the river's many other uses. Ongoing debate about federal management of the Missouri River main stem reservoirs, the largest reservoir system in the nation, also could diminish Missouri's beneficial uses of the Missouri River. At the same time, we are obligated to use the water

wisely and efficiently, and return as much water as possible to the Missouri River, in as good a condition as possible, for the use of our downstream neighbors.

National attention has focused on a phenomenon in the Gulf of Mexico called “the Dead Zone.” This is a 7,000-square-mile area off shore from the Mississippi delta below New Orleans where the Gulf waters are very low in dissolved oxygen. This condition is called hypoxia. The oxygen- deficient waters are lethal to many forms of marine life. The Dead Zone is generally believed to be caused by nutrients (primarily nitrogen and phosphorus) that drain from sewage treatment plants and off farm fields in the nation’s “Grain Belt” into the Mississippi River.

#### Upper Mississippi River-Illinois Waterway System

The sustainability of the Upper Mississippi River System is extremely important to the economy of the State of Missouri as well as the entire Midwest Region. Currently, the navigation system is antiquated and the ecosystem is becoming increasingly degraded. Several of the existing locks and dams were built in the 1930’s and have exceeded their design life. In October 2004 the U.S. Army Corps of Engineers (Corps) released a Feasibility Report and Environmental Impact Statement for a dual purpose integrated plan that if implemented would improve navigation efficiency and environmental sustainability on the Upper Mississippi River and Illinois Waterway System. Authorization of this work was included in the Senate’s version of the 2004 Water Resources Development Act, which is yet to be enacted by the U.S. Congress.

The navigation improvements include mooring facilities, switchboats, seven new locks, and related mitigation within the framework of a \$2.4 billion plan with an initial authorization of \$1.878 billion. The costs of the navigation improvements will be shared equally between the Federal Government and the Inland Waterways Trust Fund. The plan call for five new 1,200-foot locks on the Mississippi River (Locks 20, 21, 22, 24, and 25) and new locks at LaGrange and Peoria on the Illinois River.

Ecosystem restoration actions include island building, fish passage at dams, floodplain restoration, water level management, backwater and side channel restoration, wing dam and dike alterations, island and shoreline protection, improvements to topographic diversity, and switching to dam point control with in a \$5.3 billion, 50-year framework plan with an initial authorization of \$1.462 billion.

#### **Advocacy, analysis and monitoring**

##### Objective

Maintain a sufficient flow of water in the Missouri River to support the needs of Missouri’s citizens.

##### Strategies

- Continue to oppose Missouri River Master Manual changes or other policies that negatively impact or restrict Missouri’s economy or use of the Missouri River by agriculture, communities, businesses and transportation when there are other

options, or where the changes are not scientifically justified in the ongoing interstate discussions, negotiations and resolution of legal issues.

- Continue as the lead agency for interstate river issues and hold membership in such organizations as the Upper Mississippi River Basin Association, the Lower Mississippi River Conservation Committee, and the Mississippi River Parkway Commission to protect Missouri's interest and assist in addressing environmental issues such as hypoxia in the Gulf of Mexico.

## Quantity of water resources

Missouri's aquifers contain an estimated 500 trillion gallons of fresh water. Despite this tremendous resource, groundwater overuse in some areas has caused groundwater levels locally to decline tremendously.

Drinking water has become a serious concern for at least twelve counties in northwest Missouri: Andrew, Atchison, Buchanan, Caldwell, Clinton, Daviess, DeKalb, Gentry, Harrison, Holt, Nodaway and Worth. Water supply problems include dry wells, wells that are dry periodically and/or well water that is undrinkable requiring many to haul water for both home and agricultural use. Water distribution problems results largely from aging treatment facilities and distribution lines. Compounding these conditions are forthcoming, more stringent federal regulations for drinking water protection.

Groundwater resources provide much of the water used in southwest Missouri. Several major cities, including Springfield, Joplin, Neosho, Branson, and Lamar have developed surface water supplies that provide a significant percentage of their water supply, but all four communities still rely at least partly on groundwater resources.

Branson and Springfield have in recent years increased their capacity to produce and treat surface water. Joplin, however, has faced difficulties in obtaining additional surface water. Joplin uses water from Shoal Creek. Shoal Creek supplies considerable water during normal rainfall periods, but during extended drought the flow rate is not substantially more than what the treatment plant can use. Increasing the treatment plant capacity will not significantly mitigate the problem unless additional raw water capacity is developed.

Joplin has joined with many other communities in that area to form the Tri-State Water Resource Coalition in 2003. The organization's membership consists of a private/public partnership of communities and private water utilities, mostly in the greater Joplin Metro Area. Membership also includes interests from Kansas and Oklahoma. The group meets on a monthly basis.

Most recently the coalition has entered into contract with the U.S. Army Corps of Engineers to conduct a water resource study, to be completed by 2006. The State of Kansas has also requested Missouri's assistance to acquire federal funding to conduct an enhanced groundwater study. The Tri-State Water Resource Coalition has proposed that additional, more definitive water supply studies be performed to help verify the results of the earlier study and to also help outline potential sources of additional surface water. Options being considered include reservoir construction, developing additional surface-water intake structures on other drainages, and using a pipeline to convey water from an existing reservoir.

A recent water-supply study commissioned by Missouri American Water Company, operator of Joplin's water system, showed that if a severe drought occurs within as few as ten years groundwater supplies may fail to provide adequate water in the Joplin area.

Groundwater flow models predicted that increased production from wells in that area during drought may cause groundwater levels to decline to the point where pumping equipment could no longer produce adequate water.

Aquifer storage, streamflow and reservoir storage data are important for knowing the volume of water Missouri has available for use, but it is also vital to know how much water is being used. The statewide collection of accurate and timely water use information is paramount to fully understanding water supply issues in Missouri.

### **Monitoring, analysis and planning**

#### Objective

Increase the number of groundwater monitoring wells from 72 in 2004 to 78 by 2007.

<b>Number of groundwater monitoring wells in statewide network equipped with satellite telemetry to relay real time water level data in the Internet.</b>				
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Monitoring wells	70	70	72	75
Note: The division goal of 200 wells would allow the state to have at least one well per county with additional wells in the areas of highest groundwater usage, based on approximately 1 well per 3 billion gallons used.				

#### Strategies

- Facilitate options and solutions for drinking water supply problems in Northwest Missouri. Provide onsite staff assistance through the newly opened satellite office in Maryville.
- Continue to monitor groundwater-level declines in the southwestern part of the state (particularly Greene, Christian and Mc Donald counties). Through analysis, propose possible solutions to groundwater shortfalls to local decision makers.

## Quality of Missouri's water resources

A little more than half of Missouri's 22,203 classified (having permanent flows or maintaining pools in dry seasons) stream miles fully support aquatic life. Of the 10,900 stream miles that do not fully meet water quality standards, approximately 1,150 miles are impaired by heavy metals or toxic chemicals. Roughly 10,000 miles are impaired by a decrease in the quality of stream habitat caused by such actions such as channelization or sloughing of stream banks.

Of Missouri's 293,759 lake acres, most are threatened by eutrophication, a condition that occurs when nutrient enrichment of a water body leads to increased algae growth. About 80,000 lake acres are impaired by mercury, manganese or nutrients.

About 34 percent of Missouri's population rely on groundwater as their source of drinking water. While most public drinking water supply wells and many private wells are deep, properly cased and properly grouted, some older, inferior quality private wells are shallow, not properly cased, nor properly grouted. More than 8,000 new wells are drilled each year in Missouri; however, the department estimates that less than 70 percent of these wells are properly certified and more than 300,000 abandoned wells remain unplugged in our state. Septic tanks, feedlots or chemical handling sites located near the wells easily can contaminate them. By properly constructing and maintaining wells and encouraging aquifer protection, we protect the groundwater resource to ensure safe drinking water for future generations.

There also is increasing evidence that groundwater quality is being threatened by our daily activities. Preliminary investigations by the Centers for Disease Control and the U.S. Environmental Protection Agency indicate that illnesses related to drinking water may be more prevalent than previously assumed. Some scientists indicate that as many as 25 percent of public wells in the U.S. – thought to be producing safe water – may be contaminated with viruses.

Percent of stream miles and lake acres that are safe and usable for the designated beneficial purposes					
	1996	1998	2000	2002	2004
% Stream Miles	52.7%	52.7%	51.5%	48%	50%
% Lake Acres	84.6%	85.4%	94%	69%	71%
Missouri has 22,203 stream miles and 293,759 lake acres classified Data available on a bi-annual basis as reported in the 305(b) report to the US Environmental Protection Agency.					

<b>Major water pollution sources in Missouri's classified waters</b>		
	Percent of classified stream miles	Percent of classified lake acres
Crop production/grazing	34%	15%
Channelization	17%	
Flow regulation		4%
Mining	1%	
Municipal and other domestic point sources		15%
Atmospheric deposition (mercury)	4%	9%
<b>Major contaminants in Missouri's classified waters</b>		
	Percent of classified stream miles	Percent of classified lake acres
Sedimentation/Habitat Degradation	46%	
Low dissolved oxygen		1%
Mercury	4%	9%
Other metals	1%	3%
Nitrogen/Phosphorus		15%
Flow alternation		0%

#### Strained sewer systems.

Among the largest of these communities are the St. Louis Metropolitan Sewer District (MSD), Kansas City and St. Joseph. The St. Louis Metropolitan Sewer District is by far the largest sewer district in Missouri. MSD faces enormous challenges today:

- Growth in the large service area;
- Age and undercapacity of the existing wastewater collection system;
- Poor condition of some independent systems added to the MSD system;
- Handling wet weather flows.

The challenge before the Department of Natural Resources and MSD in dealing with wastewater treatment needs and wet weather flows is enormous. While the total cost to achieve compliance has not yet been estimated, it is expected to be in the billions of dollars and to take decades to resolve. It is important to note that unpermitted bypassing of wet weather flows from the MSD sanitary sewer system is not compliant with federal requirements and must be addressed. Implementation of corrective action must start right away. MSD and our water pollution staff have been working together to develop its long-term control plan, which will be used to guide implementation of new infrastructure.

Improvements will benefit not only MSD but also its users and to the St. Louis economy. Right now, developers and others don't know where to build because several wastewater facilities are at, or near, capacity. Following through on the commitments in MSD's 15-year plan will help protect the environment and public health. The Department of Natural Resources is committed to working together with MSD to ensure that it reaches regulatory compliance and the protection of public health and safety.

The department is also working closely with Kansas City and St. Joseph to develop a long-term control plan to address wet weather issues

#### Missouri/Arkansas Water Quality Issues

Missouri and Arkansas share waters in this region, not only of Table Rock but also other lakes and streams. Table Rock Lake is important to southwest Missouri's tourism economy. Since 1999, Missouri has imposed local stakeholder driven regulations that require Missouri-side communities in the Table Rock Lake watershed to reduce the amount of the water contaminant phosphorus being discharged from wastewater treatment facilities. Funding has been provided by the Department of Natural Resources and the federal government to assist communities with installation of special phosphorus removal equipment on wastewater facilities. The result has been a 90 percent reduction in phosphorus discharges into the Missouri-side watershed of Table Rock Lake.

The department continues to meet with Arkansas in its efforts to reduce phosphorus input from the Arkansas side. Arkansas streams contribute about 48 percent of the flow into Table Rock Lake. The Arkansas economy in the Table Rock Lake watershed is largely comprised of poultry production and related meat processing. This has resulted in an abundance of phosphorus from the land application of poultry litter and the wastewater discharges associated with poultry meat processing. In recent months Arkansas has imposed phosphorus limits on some wastewater discharges including the cities of Berryville and Green Forest. They are also working with the agricultural community to reduce the amount of poultry litter that can be applied in certain watersheds.

#### Missouri/Oklahoma Water Quality Issues

The Elk River Watershed of Missouri flows across McDonald County and into the Grand Lake of the Cherokee's. Grand Lake generates an important tourism economy for northeast Oklahoma and is also an important drinking water supply for several communities. Oklahoma has taken an active interest and communicates regularly with Missouri on key water pollution permits. Of special interest have been the Simmons Foods Poultry Processing Plant and the City of Southwest City.

#### Nonpoint pollution

Nonpoint pollution, a type of pollution that does not come from specific discharges, poses a serious threat to Missouri water quality. Runoff is an example of this type of pollution. This pollution affects almost half of Missouri's streams and rivers and about one quarter of all lake acres. Problems include contamination of surface water resources with microbiological contaminants, pesticides, fertilizers, animal manure, the effects from channelization or modification of streams, mining operations and atmospheric deposition of acidity and mercury from coal combustion.

#### Point source pollution

Point source pollution refers to pollution that comes from a single point, such as a pipe. The number of miles of streams that are impaired, or that fail to meet water quality standards, because of point source wastewater discharges has generally held steady since 1984, when statewide data on stream quality first became available. In 1984, 105 miles of classified streams were judged to be impaired by domestic or industrial waste waters. The lowest estimate of this type of pollution was 42 miles in 1996.



Since then, estimates have increased in part due to expansion and improvement in Missouri's water quality monitoring activities. This has allowed more accurate estimates of water quality statewide. Estimates also increased due to better understanding of and closer attention to the listing of waters with problems. A clearer focus on these waters does not actually indicate a change in the quality of the resource itself.

Not all of Missouri's waters are high quality, or even the minimum quality required by regulation. Some waters do not meet the state's water quality standards. Subsets of those waters are listed on the Missouri 303(d) List. This list identifies many sources of water pollution, including wastewater treatment plants, quarries, agricultural runoff, urban runoff and abandoned mine lands, among others.

Missouri has many examples of activities that are done in a way that protects water quality; the remaining challenge is to ensure that all activities are done in a way that will protect water quality and that those waters not meeting water quality standards are restored. The department began the Clean Water Forum to bring together the public, industry, agriculture and other interested parties to resolve problems related to the enhancement of water quality. The Innovative Technologies workgroup has also been convened to espouse the use of new technologies with the promise of more efficient wastewater treatment facilities or lower costs.

#### Confined Animal Feeding Operations

There are about 400 Concentrated Animal Feeding Operations (CAFOs) in Missouri. These facilities generate large amounts of animal manure and have the potential to cause serious water pollution problems. Concerns center on the cumulative effects of numerous smaller capacity animal production facilities in an area, as well as the potential for contamination from large facilities. Finding ways to safely use animal waste, particularly poultry litter, will continue to be among the state's top priorities, especially in southwest Missouri where improper handling or disposal of poultry litter can impair the region's rivers, lakes and streams.

#### Past lead and zinc mining activities

Past mining activities have also impacted water quality in Missouri. Abandoned lead-zinc mines continue to impair waters decades after mining has ceased. Unfortunately, very few resources are available to address this issue. Twenty-four years of coal mine reclamation and other programs in Missouri have reduced the impairment by acid drainage from coal mining from about 100 to 15 stream miles. A federal tax on coal funds reclamation of historic coal-mined lands nationwide. This tax, collected at the federal level, was scheduled to expire in 2004 but has been renewed through 2006. For the remaining impairments and other areas bordering lead-zinc and coal mines, long-term effects most likely will remain. The department's Division of Geology and Land Survey is conducting an inventory of several thousand lead, zinc and barite mines to assist in prioritizing future sites for cleanup.

Deleted:

### Soil erosion

The number one pollutant, by a very wide margin, entering Missouri's waters is soil. As soil is washed from the land, it takes other pollutants, such as pesticides, bacteria and fertilizers, with it. Water washing over the land or through the soil can also carry dissolved chemicals all the way to the Gulf of Mexico by the Missouri and Mississippi Rivers. By keeping soil and water that contain agricultural chemicals from entering Missouri's streams, rivers, lakes and water supply reservoirs, we can protect the quality of Missouri's water.

The Soil and Water Districts Commission, in its "Plan for the Future," has responded to the growing need to address the water quality issues within the soil and water conservation equation. Agriculture is totally dependent upon water and in turn affects the quality and quantity of water leaving agricultural land. Conservation practices lead to greater water infiltration and less run-off and erosion. Conservation practices hold water in the upland and release it more slowly into the watershed, increasing soil moisture, helping to grow crops and lessening downstream impacts such as flooding, sedimentation and agricultural chemicals in the water. The department's efforts in soil conservation are funded through the Parks and Soils Sales Tax which will be considered for reauthorization in 2006.

### **Permitting or certification, compliance assistance, inspection and enforcement**

#### Objective

Maintain compliance with Missouri's Clean Water Law for permitted facilities and sites inspected by the department at least at the 82% rate after implementation of new clean water standards. Incorporate new water quality based requirements as needed, including disinfection of wastewater discharges to the extent necessary to protect public health.

<b>National Pollution Discharge Elimination System (NPDES) permitted facilities in compliance with state and federal Clean Water Act, including monitoring and reporting requirements</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>
Inspections of permitted entities	1596	1670	1281
Percent of facilities inspected and in compliance	87.3%	82.4%	69.2%
Permit holders for control of discharges to the waters of the state of Missouri			
Municipals	893	899	791
Non-municipals	2,207	2,222	2,153
Concentrated Animal Feeding Operations	444	446	438
Stormwater	6,419	7,470	6,532
General	1,662	1,627	1,601

<b>Stream miles protected for whole body contact recreation</b>			
	<b>2005</b>	<b>2006</b>	<b>2007</b>
Stream miles	5,531	20,471	18,793

<b>Enforcement actions initiated to achieve compliance with state and federal Clean Water Act</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>
Notices of violation (NOV) issued by department regional offices	681	896	703
NOV's resolved by the regional offices	603	835	647
Enforcement referrals to the central office of the Water Protection Program	63	58	56
Enforcement referrals to the Attorney General's Office	15	3	8

#### Strategies

- Pursue opportunities to resolve water quality problems with a variety of stakeholders including use of innovative technology.
- Offer initial assistance visits to newly permitted facilities or those that have never had an inspection to enhance compliance, understanding of permit requirements, and adhering to environmental requirements from the outset.
- Working with stakeholders, state, local and federal partners, and the regulated community, promulgate water quality standards that meet federal requirements by April 2006.
- Increase the technical assistance provided to cities, counties and permittees to enhance understanding of effective and efficient erosion control practices.
- Increase inspection of land disturbance permittees to ensure protection of both land and water resources.
- Focus efforts on mercury pollution from power plants, medical and hazardous waste incineration; cement kilns and dental waste that pose a particularly significant threat to Missouri's rivers and streams.
- Establish TMDLs for bodies of water to determine the most effective course of action to increase compliance with Missouri's Clean Water Law.
- A lack of financial resources threatens the stormwater protection program. Seek needed resources and implement a full stormwater protection effort.
- Conduct Use Attainability Analyses to determine where waters can support whole body contact recreation so that appropriate standards on those waters are set.

#### **Monitoring, analysis and restoration**

##### Objective

Increase the number of stream segments with approved TMDLs from 63 in 2003 to 119 by 2007.

<b>Stream segments subject to one of the following actions: TMDL completed, permits issued to resolve the impairment, or delisting due to data showing attainment of uses</b>				
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Number of Actions	4	35	18	13
Cumulative number of actions approved by EPA	28	63	81	94
12 TMDL's are scheduled to be completed in 2006				

<b>Total dollars of grants awarded for water quality studies</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>
New Grant Funds Available	\$6,234,582	\$4,344,992	\$5,144,916
Grant Funds Awarded	\$3,958,357	\$2,753,884	\$1,958,535
Recipients of water quality study grants			
Government Entities	12	11	23
Nonprofit Organizations	7	5	5
Educational Institutions	7	10	3

<b>Total amount of funds expended to fully or partially restore impaired waterbody segments identified on the 303(d) list pursuant to the Clean Water Act.</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>
Dollars expended	\$2,780,605	\$3,129,996	\$3,694,038

<b>The number of waterbody segments removed from the 303(d) list as a result of restoration.</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>
Waterbody segments restored and removed from the 303(d) list	26	0**	0**
<p>The 303(d) list is developed every two years.  The 1998 303(d) list is used as a baseline.  The 2002 303(d) list was submitted to EPA by the department in August 2002 (FY2003). Final EPA action was not taken until December 2003  EPA did not require Missouri to submit a 303(d) list 2000.  **During 2004, the Clean Water Commission directed the department to establish new methodology for development of the 303(d) list. This has resulted in an effort to combine the 2004 303(d) list with the 2006 303(d) list.</p>			

#### Strategies

- Work with local entities to encourage the development of locally led voluntary watershed management plans.
- Provide technical assistance to communities in Northwest Missouri seeking to develop additional surface water resources to meet drinking water needs.
- Identify surface water use trends to evaluate needs in an effort to ensure adequate surface water resources for industrial, agricultural, municipal and domestic use.

## Water Infrastructure Assistance

Missouri currently has 11,515 permitted wastewater and stormwater entities. Approximately 3,900 operating permit and 1,000 construction permit actions are completed each year. More than 262 leveraged loans have been awarded to communities in these efforts. Through the Clean Water and Drinking Water SRF financing, Missouri communities have saved more than \$400 million in interest compared to conventional, higher-interest rates of financing.

To facilitate easier or quicker access to the State Revolving Loan Funds, the department is undergoing a review process. The first change is the start of “Ready to Proceed” that allows communities that have attained the necessary requirements for participation in the SRF to move ahead in line of communities that are not yet ready to proceed.

### Growing infrastructure needs

The strain placed on many communities’ public infrastructure has continued to grow, while financial resources have shrunk in recent years. Over the last 30 years, communities have spent over \$1 billion in state and federal grants and loans on wastewater and drinking water infrastructure. These facilities were typically designed for a 20 year life. Many of the first built wastewater systems are aging, out of compliance and in need of upgrade, expansion or replacement. Our major metropolitan areas, Kansas City and St. Louis, have 1,187 wastewater facilities eligible for financial assistance. In rural areas, some communities lack the technical and financial resources to either develop or maintain their water and wastewater infrastructure.

## Wastewater and public drinking water infrastructure assistance

### Objective

Maintain infrastructure assistance through low interest loans and grants to construct or improve wastewater treatment, public drinking water and stormwater facilities.

<b>Amount of low-interest loans awarded to eligible local governments for construction and improvement of their water or wastewater infrastructure and for controlling urban stormwater</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>
Construction of public and animal wastewater treatment facilities	\$189,063,207	\$273,747,839	\$45,840,858
Stormwater control	\$725,000	\$0	\$0
Rural water, sewer, and other	\$5,897,000	\$1,182,965	\$13,414,600
Construction of drinking water systems	\$22,735,000	\$14,815,000	\$37,825,000

<b>Amount of grants awarded to eligible local governments for construction and improvement of their water or wastewater infrastructure and for controlling urban stormwater.</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>
Stormwater control	\$0	\$10,202,021	\$0
Forty percent grants	\$8,036,150	\$2,017,537	\$1,000,000
Rural water, sewer and other	\$6,178,340	\$5,658,579	\$1,250,000
FY 2003 Stormwater Control grant applications were not awarded until FY 2004. No bond sales occurred during fiscal years 2004 or 2005. Grant and loan awards were made from remaining balance of previous bond sales.			

<b>Communities utilizing the infrastructure loan and grants program</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>
Construction of public and animal wastewater treatment facilities	34	19	16
Stormwater control	0	67	0
Rural water, sewer and other	54	23	15
Construction of drinking water systems	9	7	8

#### Strategies

- Make participation in the State Revolving Fund more feasible by simplifying and streamlining application requirements.
- Seek resources to increase the staff to provide direct assistance to communities in comprehensive water and wastewater site evaluations, design capacity of existing facilities and to inspect facilities under construction.
- Seek to develop and implement areas of the Drinking Water State Revolving Fund that would extend eligibility of the Fund to privately owned public water systems as allowed under the federal Safe Drinking Water Act.
- Seek resources for the rural water grant program that provide assistance to publicly owned community water systems in small rural communities.
- Investigate the use of the State Revolving Fund to assist with security vulnerability assessment and emergency planning efforts.
- Establish field positions to increase awareness of the State Revolving Fund and to facilitate assistance to eligible entities.

## Clean Air

Clean air sustains us and keeps us healthy. Pollutants in air can cause early death, aggravate a variety of heart and lung problems including chest pains, and trigger asthma and other breathing problems. Other pollutants can have toxic effects, including effects on fetal and child development, and some have carcinogenic potential.

One way we measure air quality is to compare air monitoring data to the federal health-based standards known as National Ambient Air Quality Standards. The U.S. Environmental Protection Agency (EPA) develops these standards based on its authority under the Clean Air Act. In recent years, ground-level ozone, fine particles and lead have been the primary airborne pollutants of concern in Missouri.

For Missouri, the major challenge affecting clean air is air quality in the St. Louis and Kansas City areas. Discussion about air quality control measures to address these issues involves local communities, citizens, businesses and interest groups to come to remedies that will be supported and effective.

### St. Louis and Kansas City air quality

#### Ground level ozone

Naturally occurring ozone in the upper atmosphere protects the earth from the sun's harmful rays. Ground-level ozone is an irritant that damages lung tissue and aggravates respiratory disease. Ozone is also harmful to plant life, damaging forests and reducing crop yields. This pollutant is the most harmful part of what we sometimes call "smog."

Ozone is not directly emitted. It forms on hot, stagnant summer days as sunlight causes atmospheric reactions involving nitrogen oxides and volatile organic compounds. Vehicles, power plants and industrial boilers are common sources of nitrogen oxides. Gasoline-powered vehicles and manufacturing operations are major sources of volatile organic compounds.

In Missouri, St. Louis and Kansas City face the greatest threat from ground-level ozone. Both communities have worked diligently to correct this problem. Kansas City remains in compliance with federal ozone standards thanks to the use of low vapor pressure gasoline; industrial controls for printers, surface coating operations and manufacturers; and voluntary efforts by residents, including commuting and taking the bus on days when ozone is likely to form.

#### 1-hour ozone standard

The St. Louis region recently attained the 1-hour ozone standard, so the EPA granted the Department of Natural Resources' request that this area be redesignated to attainment for the 1-hour ozone standard. The trend in volatile organic compounds and nitrogen oxides that can react to form ozone, has declined during the past decade. Cleaner burning reformulated gasoline, vapor recovery at gas stations, industrial controls, vehicle

emission testing, and education all have helped the area realize improvements in air quality. Voluntary efforts have been important in St. Louis as well.

#### 8-hour ozone standard

The EPA found the 1-hour standard was not sufficient to protect public health, and consequently promulgated a new, more protective standard known as the 8-hour ozone standard. This new standard is stricter than the 1-hour standard, and the St. Louis region is not in compliance with this new standard. Therefore, St. Louis is once again a “nonattainment area ” and must develop a plan to reduce air pollution to meet this new standard. Kansas City currently is in attainment for the 8-hour standard. The summer of 2004 proved to be very mild and many areas across the country enjoyed better air quality due to these favorable weather conditions. However, 2005 showed a return to higher ozone levels, indicating that additional measures to further reduce pollution are necessary.

Illinois and Missouri have been meeting with stakeholders to begin development of the St. Louis State Implementation Plans for the 8-hour ozone standard. The St. Louis nonattainment area includes several counties in Illinois. The 8-hour ozone State Implementation Plan is due to the EPA in June 2007, and the St. Louis non-attainment area must meet the standard by 2010.

The Department of Natural Resources’ effort to meet the one-hour standard in St. Louis included an enhanced vehicle emissions testing program, the Gateway Clean Air Program, which began operation in 2000. The Gateway Clean Air Program is one of the most cost-effective and convenient vehicle emissions inspection and maintenance programs in the country and is a key component of the overall effort to reduce smog and improve the health of citizens who live in the St. Louis area.

In early 2004, the Mid-America Regional Council in Kansas City formed an Air Quality Working Group to address 8-hour ozone issues for the area. The working group is composed of local elected officials, regulated businesses and industries, and community groups. The Missouri Department of Natural Resources and Kansas Department of Health and Environment each assigned staff to assist in this effort.

The Kansas City working group was charged with developing a Clean Air Action Plan to achieve cleaner air in Kansas City before federal regulations require the region to do so. The Clean Air Action Plan contains commitments from area governments and businesses to reduce ozone-forming emissions on a voluntary basis. The commitments specify the level of emissions reductions anticipated and dates by which the reductions will occur. The plan also includes a recommendation from the Kansas City community regarding regulatory controls to be implemented if the region becomes a nonattainment area in the future. The Clean Air Action Plan was submitted to the EPA on May 10, 2005.

In September of 2005, work began on the Kansas City Maintenance Plan for the Control of Ozone. Although Kansas City is in attainment for the eight-hour standard, its previous status of nonattainment for the one-hour standard requires the region to continue to have



a maintenance plan in place. A technical workgroup has been formed with local Kansas City stakeholders to review contingency control measures. This maintenance plan must be submitted to the EPA by June of 2007.

Daily average 8-hour ozone values																
	90-92	91-93	92-94	93-95	94-96	95-97	96-98	97-99	98-00	99-01	00-02	01-03	02-04	03-05	04-06*	05-07*
St. Louis MSA	98	91	91	98	104	100	95	95	94	90	90	92	89	89	89	89
Kansas City MSA	83	82	82	90	92	94	93	91	89	84	85	84	82	83	83	83
Springfield MSA	71	70	69	75	79	78	73	73	78	75	76	73	70	73	73	73

The eight-hour National Ambient Air Quality Standard is 85 ppb, to be determined as follows: For each site, the fourth highest daily eight-hour average for each year of a consecutive three-year period are averaged. The site with the highest value determines the design value for the area. If the design value is 85 ppb or greater the area is in violation.

\*Projected

Number of ozone alert days											
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	
St. Louis area total	20	31	15	6	30	37	23	11	24	28	
Kansas City area total	2	11	1	3	10	21	6	16	14	5	
Springfield total	0	0	1	0	1	4	1	0	1	2	

Number of ozone alert days continued						
	2000	2001	2002	2003	2004	2005
St. Louis area average	17	13	31	10	0	25
Kansas City area total	12	4	12	12	0	13
Springfield total	1	1	1	0	0	0

An 'ozone alert day' is a day when at least one monitor in the area recorded an exceedance (.085 ppm) and corresponds to an Air Quality Indicator of orange (unhealthy for sensitive groups) or higher. The 8-hour standard is an average of eight 1-hour values, using a rolling forward average. The 8-hour average for 10 a.m. is the average of the hourly values for 10 a.m. to 6 p.m.

\*Projected

### Fine Particles

In revising the air quality standards, EPA created new standards for fine particles (also called PM<sub>2.5</sub>, which stands for particulate matter less than 2.5 microns in diameter.) Some fine particles are directly emitted and others are formed from precursor pollutants, as is the case with ozone. EPA's scientific review concluded that PM<sub>2.5</sub> penetrates deeply into the lungs and is more damaging to human health than the coarse particles known as PM<sub>10</sub>. Studies show a correlation between exposure to PM<sub>2.5</sub> and health effects such as premature death and increased hospital admissions and emergency room visits, especially for the elderly and individuals with cardiopulmonary disease.

In 2004, Missouri proposed to EPA that portions of the St. Louis area be classified as nonattainment for PM<sub>2.5</sub>, including St. Charles, St. Louis, Franklin, and Jefferson counties, and the city of St. Louis. Illinois has made similar proposals for areas east of St. Louis. In its final action EPA formally designated these proposed Missouri counties as nonattainment. The same group working on developing the State Implementation Plan for the St. Louis 8-hour ozone nonattainment area is also working on the plan for particulates. The PM<sub>2.5</sub> State Implementation Plan is currently due to the EPA in January 2008, and the St. Louis non-attainment area must meet that standard by 2010.

Annual averages at highest PM 2.5 concentration sites								
	98-00	99-01	00-02	01-03	02-04	03-05	04-06*	05-07*
St. Louis	17.3	16.4	15.2	15.4	14.4	13.4	14	14
Kansas City	14.1	13.4	14.2	14	13.3	12	12	12
Springfield	12.2	12.3	12.2	12.6	11.7	10.9	11	11
The National Ambient Air Quality Standard for PM 2.5 is 15.0 ug/m3, averaged over a three year period. Meteorological conditions in 2004 were conducive to lower PM 2.5, which may not occur in 2005. *Projected								

### **Coordination, design and implementation of air pollution reduction strategies**

#### Objective

Provide information on air quality and emissions sources necessary to determine trends and any air quality problems, and pollutant sources which might be contributing.

#### Strategies

- Maintain air monitoring network and provide compliance and trends data. Implement any first year changes under EPA's new Ambient Air Monitoring Strategy and Region VII Regional Monitoring Plan developed in 2005.
- Gather information about sources of air emissions including stationary and mobile sources for use in air quality planning efforts. Provide these data for SIP development and fee determinations.

#### Objective

Improve air quality to attain or maintain the following:

- Attainment of the federal 8 hour ozone and PM 2.5 standards in St. Louis area by 2010, and
- Maintenance or attainment of the federal 8 hour ozone and PM<sub>2.5</sub> standards in the Kansas City area by 2010.

#### Strategies

- Continue work with stakeholders in industry and environmental groups to find common-sense ways to reduce regulatory burden and costs without sacrificing air quality
- Develop the St. Louis State Implementation Plans for the eight-hour ozone and PM<sub>2.5</sub> standards with stakeholders in both Missouri and Illinois.
- Petition the EPA to allow RFG augmented by a 10% ethanol additive made from corn to be used throughout the state.

- Continuously improve the vehicle emission testing program in order to achieve maximum air quality gains and maximum customer convenience.
- Evaluate ways in which we can work with other agencies to address asthma concerns, and other air related health and environmental problems specific to Missouri.
- Continue regular meetings with stakeholders through the Air Advisory Forum to find ways to improve the program through a free exchange of ideas, open discussion and consensus building.
- Proactively look for potential topics and issues to bring before the Forum for discussion.

# Productive Land

## Soil Conservation

Percentage of agricultural land eroding at the rate which is tolerable* ("T")			
1982	1987	1992	1997
64.50%	70.20%	76.30%	80.90%
Source: Natural Resources Inventory (NRI)			
Timeframe: data reported every 5-years from Natural Resource Conservation Service (USDA) 2002 data is not yet available.			
*Tolerable means that the amount of soil erosion does not have a significant effect on soil productivity.			

About 59 million tons of soil erodes from Missouri's land each year. Much of that soil enters our waterways, clogging and filling streams, reservoirs and lakes. The severity of flooding is increased as these silt-laden waterways and reservoirs do not have the capacity to hold as much water. Thinner topsoil also decreases soil productivity. Less production means lost income to the landowner and higher prices for the consumer. Although soil erosion is a natural event, certain traditional farm tilling methods can accelerate erosion. This depletes the soil, requiring more use of fertilizers and pesticides and sometimes even rendering it useless. Our goal is to have 95 percent of Missouri's agricultural land protected so as to maintain its long-term productivity. With funding from the parks-and-soils sales tax, the department's Soil and Water Conservation Program has given approximately \$396 million to 168,500 landowners for soil conservation efforts.

As recently as 10 years ago, Missouri was second in the nation for its rate of soil erosion. Because of its climate, topography and the types of soils common to the state, Missouri will need to continually address significant erosion problems on land used for cultivated crops.

However, since 1982, Missouri has reduced its rate of soil erosion more than any other state. By 1997, Missouri was tied for seventh in the nation for its rate of soil erosion. Much of this success can be attributed to the parks-and-soils tax. In 1984, 1988 and 1996, Missourians voted to support a one-tenth-of-one-percent sales tax that finances activities by the department's Soil and Water Conservation Program and Missouri's state park system.

Funds are available to landowners to pay up to 75 percent of the cost of putting soil conservation practices on the land. This money will be lost unless the tax is renewed by 2008. The renewal will be voted on initially in 2006. Placing the sales tax on the ballot every 10 years is a way of measuring how voters feel about soil and water conservation and their state parks. It keeps the department accountable to the people. The accountability of having a regular renewal of the tax helps motivate staff to continue to provide a high degree of public service and accountability.

Soil conservation efforts include the mapping and interpretation of soils so that effective soil management can be put into practice based on the capabilities of soil throughout the

state. Two phases describe the soil science efforts. Phase 1 of the Missouri Cooperative Soil Survey update includes:

- a detailed evaluation of each previous survey's spatial and characterization data;
- digitally identifying areas where further study or investigation is needed;
- adjusting soil lines where obvious corrections can be made without compromising the integrity of the survey;
- developing a simplified and improved state-wide legend based on Major Land Resource Areas (MLRA);
- improving soil map delineations (or joins) across county lines;
- evaluating availability and completeness of statewide characterization data then collecting and analyzing soil samples to fill data gaps;
- evaluating the spatial component of laboratory data; and
- developing and delivering an improved statewide soil survey product.

Phase 2 of the soil survey update includes:

- providing soil survey products based on users' needs and priorities;
- implementing projects which including the state-wide or Major Land Resource Area (MLRA) based evaluations of specified soil series, more detailed mapping and sampling in specified areas (such as watersheds, subsets of MLRAs, Ecological Land Types, etc.);
- special studies and other projects based on user needs; and
- periodic delivery of a continually improving soil survey product for Missouri on the web and by other means.

## Financial assistance

### Objective

Reduce erosion on approximately 3.7 million acres through financial assistance to reach our goal of 95 percent of Missouri's agricultural land eroding at tolerable rates or less.

Cumulative tons of soil saved through financial assistance opportunities (millions of tons)									
1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
37.38	51.49	60.62	65.90	68.66	72.00	76.50	81.00	84.31	87.7
Source: Program database summaries of regular cost share, Special Area Land Treatment (SALT) cost share and Agricultural Nonpoint Source (AGNPS) projects									

Soil saved per incentive grant per practice (tons)					
2000	2001	2002	2003	2004	2005
490	510	506	450	445	487
Source: Data is calculated by dividing the tons of soil saved in a particular year by the landowners receiving financial assistance for a practice. The calculations are based on research conducted by the US Natural Resource Conservation Service.					

<b>Requests for financial assistance</b>							
	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Requests processed for grant payments	6518	7954	6627	8400	8173	7487	7433
Total clients served by incentive grants	8072	8703	7297	9176	9012	8326	8332
In this instance, processed is synonymous with awarded. Clients include landowner applicants and district offices. Incentive grants include district grants, cost share and SALT cost share financial assistance. The method used to count processed payments was changed in FY-03 which caused the spike in the FY-02 figure.							

<b>Efficiency in requests processed</b>				
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Cost Share Claims processed	8400	8173	7487	7433
Requests for waivers* *Not included in calculation below.	37	23	16	12
Appeals to Commission	7	16	19	14
Percentage of landowner claims processed that meet the program rules and policies	99.9%	99.8%	99.7%	99.8%

#### Strategy

- Working with partners in both the agricultural and parks communities, seek renewal of the Parks and-Soils Sales Tax before 2008.

### **Soil and Water Conservation Districts assistance**

#### Objective

Maintain administrative support and training for Missouri's 114 locally elected soil and water conservation district boards and their employees.

#### Strategies

- Provide assistance to district boards at board meetings and other opportunities as needed.
- Utilize problem-solving skills to help district boards deal with challenging administrative issues such as personnel, finances and cooperative projects.
- Provide training and assistance to district boards and employees to appropriately administer the assets of the soil district including funding and equipment.
- Support district efforts to track finances through a special computerized accounting system.
- Plan the annual training conference on behalf of the Soil and Water Districts Commission with the assistance of the Missouri Association of Soil and Water Conservation Districts.
- Develop and monitor contracts to conduct independent audits of districts.
- Facilitate efforts of the soil and water conservation districts to develop and enhance information and education programs to instill a sense of soil and water conservation stewardship.

## **Brownfields**

Brownfields are sites where redevelopment and reuse is hampered by known or suspected contamination from hazardous substances. While many Brownfield sites are minimally contaminated, potential environmental liability can be a problem for owners, operators, prospective buyers and financial institutions and communities. Because of the large number of these sites, their economic impact – especially in heavily industrial areas – is substantial. Often brownfields are in historic areas of cities, so historic preservation becomes another consideration.

The department seeks to resolve these issues so Brownfields redevelopment and reuse can proceed. The department provides consistency, including assurances that the property has been cleaned up to standards safe for its intended use. Successful cleanup and long-term stewardship of any residual contamination provides the certainty that makes redevelopment happen. Brownfield cleanup puts property back into productive use, encourages redevelopment and increases economic development in distressed areas. In Missouri, 186 brownfield sites currently are undergoing cleanup. Another 274 sites have been cleaned up and returned to use since the cleanup program's inception in 1994. Approximately 42% of Brownfield sites are cleaned up in a year or less and over 65% of Brownfield sites are cleaned up within 2 years

A growing problem is the abandonment of significant parts of our urban core areas. Traditional neighborhoods, downtown business districts and once-thriving industrial areas become stagnant and underutilized. This results in a loss of economic opportunities for the residents of these areas. This only serves to fuel the conditions leading to further abandonment. Combining historic preservation efforts with cleanup of contaminated urban land, or brownfields, will strengthen our cities.

## **Long Term Stewardship at Weldon Spring**

The Weldon Spring Site is located in southwest St. Charles County approximately 30 miles west of downtown St. Louis. The site consists of two main areas, the Weldon Spring Chemical Plant and the Weldon Spring Quarry. Both areas were previously part of the 17,233-acre Weldon Spring Ordnance Works, an explosives production plant operated by the Department of Defense during World War II. Operation of the chemical plant and ordnance works resulted in contamination of soils, sediment and buildings at the chemical plant and waste deposited in the quarry.

In 1986 the U.S. Department of Energy accepted responsibility for remediating the sites and in 1987 the quarry was placed on the Environmental Protection Agency's National Priorities List or Superfund.

Long-term stewardship is the cornerstone of a completed cleanup at this site because of the long life of the contaminants (e.g. uranium half-life 4.5 billion years) that are being left in place. Separate plumes of contaminated groundwater will be left to weaken over time. Institutional controls must be in place to ensure long term enforcement and durable

restrictions to keep people living and working in the area, safe. Long-term stewardship addresses not only protecting our generation but future generations, as it relates to the operation and maintenance of the site.

## **Remediation**

### Objective

Maintain the number of cleanups completed each year at least at 200 per year.

<b>Brownfields/VCP cleanups completed (annually)</b>										
<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
2	9	16	16	20	25	26	33	44	45	28

### Strategies

- Work with department staff and the Department of Economic Development to develop Brownfields to revitalize their urban cores along with preserving historic resources.
- Finalizing the Tri-party Federal Facility Agreement and implement the Long-Term Surveillance and Maintenance Plan for Weldon Spring which sets out all activities, including acquisition of land use controls, necessary to ensure protection of human health and the environment.
- Apply the Risk Based Corrective Action document to facilitate risk based cleanup and appropriate reuse of property that results in economic development and protection of human health and the environment. Improve and enhance long-term procedures to monitor and enforce institutional controls and long-term stewardship.



# Missouri's Energy and Economic Security

The Department works to ensure that Missouri's energy supplies are adequate, diverse and reliable and produced and used in an environmentally sound manner. Two major areas of focus are energy efficiency and the development and use of Missouri's renewable energy resources which contribute to self-sufficiency and fuel diversity and benefit Missouri's energy security, environment and economy.

Energy consumed by fuel type in Missouri									
	1994	1995	1996	1997	1998	1999	2000	2001	2002-2004*
Fossil fuels	91.2%	92.5%	93.0%	93.1%	93.2%	93.4%	93.0%	94.0%	NA
Nuclear	6.5%	5.2%	5.3%	5.3%	4.9%	4.8%	5.9%	4.8%	NA
Hydroelectric	1.2%	1.1%	0.7%	0.8%	1.3%	1.0%	0.2%	0.5%	NA
Other renewable	1.2%	1.2%	1.0%	0.8%	0.7%	0.8%	0.9%	0.7%	NA

\* Data provided by the US Department of Energy has a several year lag in reporting.

Trillion BTU's of renewable energy consumed in Missouri	2002	2003	2004	2005
	5.28	7.55	7.76	8.39 (projected)

Total Missouri energy expenditures by fuel type (\$ million)									
	1994	1995	1996	1997	1998	1999	2000	2001	2002-2004*
Electricity	3,749	3,892	3,962	4,002	4,195	4,186	4,370	4,414	NA
Petroleum	4,705	4,927	5,840	5,769	5,147	5,759	7,062	6,990	NA
Natural Gas	1,281	1,171	1,519	1,591	1,368	1,341	1,736	2,363	NA
Coal	42	43	41	50	42	42	35	41	NA
Other	14	15	16	12	10	11	16	13	NA
Total	\$9,791	\$10,048	\$11,378	\$11,424	\$10,762	\$11,339	\$13,220	\$13,822	NA

Comments: Fossil fuels consist of coal, natural gas and petroleum minus ethanol contained in transportation fuels.

"Other" energy use includes direct heat or electricity produced by wind or solar.

\*Data provided by the US Department of Energy has a several year lag in reporting.

Renewable energy consumption includes biomass (ethanol, biodiesel, industrial and utility wood use, biogas from wastewater treatment plants and landfills), solar, and wind energy sources. Non-fossil resources not included are hydroelectric generation (due to its year-to-year variations that would reduce the value of the data series as an indicator); residential charcoal and wood use, consumption of crop waste, as it is not produced as a fuel, and waste tires.

Missouri's consumption of energy from all sources has increased 20 percent from 1990 through 2001. More than 95 percent of Missouri's primary energy sources (natural gas, coal and petroleum) are imported from outside the state increasing energy expenditures

22 percent between 1999 and 2001, from \$11.3 billion to \$13.8 billion. In 2001, Missouri ranked as the 20th highest energy-consuming state in the nation.

The potential for solar, biomass and wind resources exists in Missouri and in surrounding states. While Missouri's wind energy resources are not as abundant as some of our neighboring states to the north and west, we do have the potential for utility-scale development at some locations in the state, particularly in northwest Missouri. The Energy Center's updated wind maps and assessments make wind-resource data available to developers and utilities as they consider developing this renewable resource. Every day, Missouri's farms have access to bioenergy and solar and wind energy. New technologies offer the opportunity to harvest this energy, as well as for sustainable cash crops. The Department of Natural Resources' Energy Center has developed a model to help electric cooperatives, municipal electric companies and rural industries assess biomass as an energy source.

In recent years Missouri has been active in the development and use of ethanol. In 2005, Missouri attained an annual ethanol production capacity of 110 million gallons per year. Ethanol production facilities are located in Craig, Macon and Malta Bend, and another facility that will add 45 million gallons per year of capacity in 2006 is under construction in Laddonia. Other areas of the state are studying the feasibility of building ethanol plants as well.

Biodiesel production in Missouri is also helping to increase our indigenous supply of fuels. Two plants of less than 10 million gallons per year are operating in Bunceton and Bethel, and a 30 million-gallon-per-year facility should begin production in Mexico in 2006.

Initiatives to develop renewable energy provide us with an opportunity to put to good use products that might otherwise have harmed our environment. Pollution from poultry litter, for example, has found its way into our rivers, lakes and streams, doing serious harm to these bodies of water. Several groups have worked together to create a Web site to help develop a market for poultry litter, putting together those who need it with those who have it. Poultry litter has great versatility and has been proven to be a viable energy source. Other forms of biomass such as trees, grasses, agricultural crops or other biological material can be converted to energy. The department is assisting in developing data and infrastructure necessary to increase use of these materials for energy and petroleum substitute products such as plastics, polymers and adhesives.

Opportunities abound to advance energy efficiency and the development of Missouri's clean renewable resources to help meet our energy needs. Several Missouri electric utilities have announced interest in building coal-fired power plants in Missouri. Energy efficiency moderates demand, helping to reduce the demand for energy, increasing the supply and containing energy prices. Energy efficiency provides additional environmental and economic value by preserving natural resources and reducing emissions and keeps more of Missouri's energy dollars within the local economy.

The Missouri Energy Center administers the department's Energy Loan Program. Since the loan program was initiated in 1989, the center has made more than 400 loans which have financed over \$65 million in energy-efficiency projects statewide. These energy-efficiency projects have saved school districts, higher education institutions and local governments an estimated \$72 million in cumulative energy costs to date. These projects, through the reduction of energy demand, have also helped to reduce air pollution and greenhouse gases in Missouri as well.

The department also assists state agencies in the identification of energy efficiency opportunities. State agencies, including universities, spend about \$78 million for energy use in state facilities. If this energy bill were reduced just 10 percent, a conservative estimate, savings to the State of Missouri would be \$7.8 million annually over the life of the efficiency measures.

One way in which the Energy Center has collaborated with state agencies to reduce energy costs has been to work with the Office of Administration's Division of Facilities Management Design and Construction (OA) to promote a funding process called energy savings performance contracting. To utilize this process, the state first must procure the services of an energy service company, who audits the state buildings and identifies specific energy-efficiency improvements. The company then guarantees that the state will realize a specific amount of energy savings from the project. The company also arranges third-party financing so no extra money is needed from scarce state revenues. The savings obtained from lower utility bills then pays back the financing as the state begins to realize the energy savings. The benefit of this technique is that the cost savings provide a method to implement capital improvements and maintenance and repairs of state buildings using monies that would otherwise be spent on utility and maintenance cost, rather than needing to appropriate capital improvement dollars in the tight state budget.

During the past year, the Energy Center has worked with the OA to implement the first performance contract projects at the Wainwright and Truman State Office Buildings. We have also partnered with OA to educate key management staff of other state agencies on this concept. OA with the help of the Energy Center plans to implement performance contracts over the next several years in 25 million of the 36 million square feet of state buildings that are currently under OA's control.

#### Volatile fuel prices

Led by record-setting crude oil and natural gas prices in 2005, primary heating and transportation fuel prices and supplies continue to be volatile in Missouri, the Midwest Region and the United States. On August 30, 2005, U.S. crude oil prices set an all-time record of nearly \$70 per barrel, affecting all petroleum-based fuel prices following the destruction of vital energy infrastructure in the Gulf Coast Region by Hurricane Katrina followed by Hurricane Rita. The Region's crude and natural gas production is not expected to return to pre-hurricane levels until early summer 2006.

Terrorist attacks worldwide, the U.S. military presence in Iraq and Afghanistan, global economic growth and the associated increase in petroleum demand, civil unrest in oil-producing countries have all placed additional demand on crude oil supplies. As a result, consumers are feeling the impact of record-high transportation fuel prices and will likely see a winter 2005-2006 increase in winter heating fuels (natural gas, heating oil and propane) according to energy analysts and the U.S. Department of Energy. In 2005, the U.S. entered the traditional summer driving period with record supplies of motor gasoline and yet, for the first time, supplies were at a deficit by the end of summer compared to the same period last year. The average U.S. retail price reached a record of more than \$3 per gallon.

Consumers face higher heating expenditures for the winter heating season. Households heating primarily with natural gas are projected to spend 38 percent more for fuel this winter than last winter. Natural gas costs are not regulated at the wholesale level and are passed on directly to consumers of regulated and municipal natural gas utilities. Propane and heating oil prices or other petroleum-based fuels are also not regulated.

In spite of propane supplies that exceed the five-year average for this time of year, consumers are paying higher prices and are expected to spend as much as 15% more to heat their homes. In October 2005, supplies of natural gas and propane for the heating season appeared to be adequate. In addition, during the past several years, the demand for natural gas to generate electricity has increased significantly across the country, placing additional pressure on natural gas inventories to meet winter heating needs.

While demand generally drove 2004 energy prices higher, in 2005 the price increases were more the result of supply concerns because of the hurricane losses, as well as the reduction in world oil spare capacity, which fell to its lowest level in more than three decades. As U.S. spot prices of crude oil and natural gas increased an average of 36 and 47 percent, respectively, total U.S. energy demand remained flat this year, despite a relatively healthy economic growth rate of more than three percent. Similarly, world oil prices climbed throughout the year despite slower demand growth in both China and the United States. In 2006, total domestic energy demand is projected to increase at an annual rate of about two percent.

## **Financial assistance**

### Objective

Maintain financial assistance for weatherization of low income homes and for schools and local governments to achieve energy savings and decrease emissions from energy use by 26,000 tons per year.

Weatherization Assistance Program cumulative energy savings			
2002	2003	2004	2005
\$261,160,110	\$274,227,359	\$286,843,545	\$299,230,286
Energy Efficiency Loan Program cumulative energy savings			
2002	2003	2004	2005
\$6,494,792	\$52,656,363	\$51,873,971	\$71,832,922
Renewable energy consumed in Missouri (Trillion Btu)			
2002	2003	2004	2005
5.28	7.55	7.76	8.39
Renewable energy consumption includes biomass (ethanol, biodiesel, industrial and utility wood use, biogas from wastewater treatment plants and landfills) solar and wind energy sources. Non-fossil resources not included are hydroelectric generation due to its year-to-year variations that would reduce the value of the data series as an indicator; residential charcoal and wood use; consumption of crop waste, as it is not produced as a fuel; and waste tires.			

**Annual estimated emissions reductions from energy efficiency loans to schools and local governments (public buildings) and weatherization assistance for homes (tons/year)**

	2003			2004			2005 (estimated)		
	Homes	Schools	Public Buildings	Homes	Schools	Public Buildings	Homes	Schools	Public Buildings
Carbon dioxide emissions	7,927	16,494	7,778	7,673	12,638	548	8,053	10,529	292
Nitrogen oxide emissions	9	22	11	9	17	1	9	14	1
Sulfur dioxide emissions	17	40	23	16	32	2	17	28	1
TOTAL	32,321			20,936			18,944		

Note: 2003 and 2004 NOx and SO2 emissions reductions have been re-calculated using EPA's revised Criteria Pollutant Emissions Coefficients, Buildings Energy Data Book, 2005. Emissions of SO2 are 28% lower for 2002 than EPA's 1994 estimates since Phase II of the 1990 Clean Air Act Amendments began in 2000. Buildings energy consumption related to SO2 emissions dropped 27% from 1994 to 2002.

Clients served annually				
	2002	2003	2004	2005
Low-income households	2,024	2,276	1,859	1990
Schools	14	19	18	21
Local governments	3	3	6	5

Strategies

- Expand outreach for energy assistance to southwest Missouri and expand the Low Income Weatherization Program to focus on multi-family structures to lower utility bills by improving a building's energy efficiency.
- Review options, including competitive evaluation of loan proposals, to continue to maximize the benefit of these monies and maintain a solvent program.

## **Policy development, monitoring and analysis**

### Objective

Continue to participate in forums on energy use and policy at local, state and federal levels, as well as monitoring and analyzing information to inform policymakers and the public.

### Strategies

- The Missouri Energy Center will continue to integrate work with the Missouri Public Service Commission and the DNR Air Pollution Control Program to increase energy efficiency and new technologies in order to decrease the negative environmental impact of energy development and use and to mitigate the impact of energy price volatility.
- Recommend actions in support of clean Missouri alternative energy to achieve the economic, environmental, energy security and public health benefits associated with diversified energy sources.
- Seek additional resources to assist the state in aggressively pursuing energy-efficiency improvements in state buildings using performance contracting.
- Monitor federal discussions about federal energy policies and processes to identify and represent Missouri's interests.
- Monitor, analyze and report on Missouri's energy supplies and prices to policymakers and the public to determine actions to promote dependable, affordable and environmentally sound production, distribution and use of energy.

## Enjoyment of Missouri's Natural and Cultural Resources

The health and vitality of Missouri's State Parks and historic sites are heavily dependent upon healthy air, clean water, protected land and rich cultural resources. They are the culmination of our efforts to protect our state's environment and cultural resources.

	1998	1999	2000	2001	2002	2003	2004	2005
Number of State Park visitors	17,309,592	18,253,665	17,905,808	18,103,273	17,760,076	17,060,086	17,120,989	17,317,708
Number of vehicles*	4,802,375	5,475,069	6,033,080	5,666,408	6,046,324	4,987,091	4,837,103	5,169,193
Number of camping permits	293,422	290,943	308,697	293,559	286,899	278,467	280,747	301,543

Number of vehicles is accumulation of those reported, not all parks and sites report the number of vehicles. Therefore, it is an estimate of the number of vehicles at DSP facilities.

Satisfaction of State Park visitors				
	2001	2002	2003	2004
Visitor satisfaction with facility operation and maintenance	94%	92%	90%	92%

Percent of state budget allocated to State Parks compared to national and regional averages.			
	2002	2003	2004
Cost per visitor	\$1.70	\$1.64	\$1.73
% state budget allocated to State Parks compared to:			
regional average	0.23%	0.20%	0.19%
national average	0.22%	0.21%	0.20%
in Missouri	0.17%	0.15%	0.17%

The mission of the State Park system is to preserve and interpret the state's most outstanding natural landscapes and cultural landmarks, and to provide recreational opportunities. To accomplish this, the system preserves the homes of famous Missourians, Civil War battlefields, and reminders of yesterday such as gristmills and covered bridges. The state's most outstanding landscapes and natural features are preserved here for everyone to enjoy – deep forests, glades, prairies, wetlands, streams and lakes. These settings provide many opportunities for recreation, including camping, hiking, fishing, picnicking, horseback riding, boating, ATV and dirt bike riding and just enjoying the outdoors.

The Missouri State Park system has consistently been ranked as one of the best State Park systems in the nation, and has a very high satisfaction rating with visitors. It was recognized as one of only three nationwide finalists in the 2005 National Gold Medal and State Park Management Awards Program.

This support is reflected in the approval by voters of the Parks-and-Soils Sales Tax, which is the primary funding source for the State Park system. This tax has been approved by Missouri voters three times consecutively and will need to be re-authorized again by 2008, when it is scheduled to expire.

The system includes many unique sites, such as Katy Trail State Park, which is the nation's longest developed rail-to-trail project, and Edward "Ted" and Pat Jones-Confluence State Park, which has been developed at the confluence of the two greatest rivers in the nation – the Missouri and the Mississippi.

Park users also can experience the solitude and wildness of the 61,000 acre Roger Pryor Pioneer Backcountry in southeast Missouri, thanks to an agreement between the LAD Foundation and the Missouri Department of Natural Resources. Located mainly in Shannon County, the Roger Pryor Pioneer Backcountry is a portion of the Pioneer Forest, the largest privately owned property in Missouri owned by Leo and Kay Drey and recently given to the LAD Foundation.

Missouri's State Parks and Historic Sites have become an important component of our state's economy as well. A study by the University of Missouri-Columbia recently found that in 2002, individuals and families visiting Missouri State Parks spent more than \$410 million in Missouri. Of that total, non-resident visitors generated \$140 million in total sales in Missouri. This includes all sales associated with the trip, such as travel expenses, lodging and groceries. When the total \$410 million is spent and re-spent in the economy, it brings the State Park system's overall economic impact in the state to \$538 million annually.

An important effort is soliciting feedback from our State Park and Historic Site visitors. Every State Park and Historic Site conducts at least one annual public meeting to talk with visitors about their site. Such feedback has led to changes and improvements, including the new centralized campground reservation system.

In December 2005, the State Park system embarked on a one year study at 6 State Parks and Historic Sites. Over the next 12 months, visitors to Felix Valle House State Historic Site, Thousand Hills State Park, Castlewood State Park, Route 66 State Park, Meramec State Park and Roaring River State Park, will be asked several questions through a survey, that asks about their satisfaction with their visit and the facilities at the park or site. The findings will help facility heads and planners learn more about the needs and desires of the visitors.

A special public input project was conducted recently. The purpose of the Missing Masterpieces survey was to gather public input regarding the standards the department uses to determine if potential new areas are worthy of inclusion in the State Park system. Additionally, the survey allowed participants to suggest "missing masterpieces" – specific natural, cultural or recreational areas they feel are missing from the system. More than 1,400 paper and Internet surveys were received, with an overwhelming percentage of respondents who agreed with the standards the department uses to evaluate new areas. Although some respondents voiced concern regarding the department's ability to expand its system within a limited budget, numerous participants also favored expansion of the current system to include new areas. These new areas included development of additional sites that interpret Native American and African American history and culture; greater emphasis on preserving Missouri's diverse immigrant history; development of additional



sites close to urban population centers; and greater emphasis on acquiring and protecting watersheds, wetlands and lands adjacent to rivers and streams. Perhaps the most gratifying result of the survey was the sense of ownership expressed by a large percentage of respondents, many of whom referred to Missouri's State Park system as 'our system'.

In a 2000 survey conducted by the University of Missouri, 99 percent of visitors reported having satisfaction with their overall experiences while in the parks. This satisfaction may be one reason the system has maintained high visitation, with estimates ranging from 16 to 18 million visits annually.

Maintaining a record of our cultural and natural resources continues to be a priority. Missouri State Parks and Historic Sites are home to a rich collection of these resources, so many efforts to gather information on these resources start here. In 2000, the department began using collections management database software to gather and maintain information on Missouri's hundreds of thousands of artifacts. A similar database has been developed to record the thousands of diverse species found in Missouri's State Parks. The continued support of the public will be necessary to ensure these species are protected as millions of visitors pass through the parks and historic sites. We must rely on each visitor to leave the park or site as he or she found it.

#### Stable adequate funding

The Parks and Soils Sales Tax and its renewal for ongoing support of the system is the most important issue facing the system. The deterioration of the park system in the late 1970s and early 1980s led to the development of the earmarked fund to provide the fiscal foundation to support the system. We are now approaching a difficult period for parks to balance funding available and the continued demands placed on the system for park, site and program expansion.

The tax provides a consistent source of revenue, dedicated only to the support of State Parks, state historic sites and soil conservation, and cannot be used for other purposes. In fact State Parks receives no general revenue and must operate on this tax and any revenues generated by the system. The commitment of the department to make park and historic site facilities accessible, safe and well maintained has absorbed the funds and created a situation where the dedicated tax and user revenues do not match the needs for growth and enhanced development desired by a growing and changing population. Therefore, the dedicated tax is necessary to maintain the current system but allows for limited, or no, growth to meet changing demands.

#### Infrastructure

Although the Missouri State Park system is considered an award-winning system, it faces challenges like all agencies that manage public lands. An immediate challenge is to upgrade the infrastructure within many of the State Parks and Historic Sites. Many of these facilities were developed in the 1930s and the infrastructure is having difficulty in supporting the millions of visitors to the system and the improved standards required for clean water and wastewater treatment.

The department has been aggressively pursuing these upgrades, but upgrades need to continue to be high priorities. Adequate infrastructure is imperative if the State Park system wants to protect the resources of the state and provide a quality experience for its visitors.

Land development around State Parks and historic sites and the impact of urban sprawl also pose a challenge. In some instances, State Parks and Historic Sites have become islands in a sea of development. The State Parks' resources and visitors are impacted by air pollution, water pollution from sediment and sewage, and noise and light pollution from outside their borders.

#### Threats

There are many changes going on in our state and on the periphery of our State Parks and Historic Sites. These factors can threaten the integrity of our sites and diminish their value as state treasures. The 1992 State Park threats study, which is currently being updated, revealed that urbanization was a serious threat in 11 State Parks and Historic Sites. Conceptual development plans and resource management plans support the need to fill in awkward park boundaries that negatively impact park management and to protect watersheds and important historic and scenic zones. Urbanization escalates land prices in and around State Parks to the extent that the department cannot effectively purchase adjacent lands. Land clearing of scenic zones, complex wastewater issues, adjacent landowner trespass, expanding deer herds in no-hunting areas, exotic species encroachment, utility easements all adversely impact natural, cultural and recreational resources linked to urban expansion.

Plant and animal species that were introduced from other countries and continents often cause tremendous ecological and economic problems in State Parks. Exotic species jeopardize native species or ecosystems in 34 parks. Plants like Johnson grass, sericea lespedeza, garlic mustard, and animals such as feral hogs, cost the system a significant proportion of its resource stewardship budget in control efforts. The problem continues to grow and threatens park and non-park land alike.

Many threats require some form of research to fully document and develop effective countermeasures to preserve and protect some of the most significant natural and cultural landmarks in Missouri. An effective research program is fundamental to the good care and management of irreplaceable State Park resources.

#### Increased expectations

Keeping up with public expectations requires expansion, upgrades, improvements and new facilities in the State Park system. There is a desire voiced by many citizens and park users for new parks and historic sites, better campgrounds, upgraded electric systems, improved security, more visitor centers, additional trails and increased number of restrooms. Stewardship of natural and cultural resources competes with other system needs that can decrease the priority given to it, thus marginalizing resource management.

## Management of Missouri's State Park System to Provide Outdoor Recreation Opportunities

### Objective

Maintain overall satisfaction with facility operation and maintenance at the satisfied level or higher.

### Strategies

- Working with partners, seek renewal of the Parks and-Soils Sales Tax before 2008. Seek additional funding beyond traditional means to enhance facilities to meet the needs of visitors, such as larger campsites with upgraded electricity.
- Support and increase the number of State Park volunteers to both increase the projects completed and to provide a sense of ownership in Missouri's resources.
- Continue to expand the service offered through the campground reservation system to address both customer and park operation needs.

### Objective

Maintain the infrastructure in the State Park system.

### Strategies

- Work with department staff to implement Environmental Management Systems (EMS) at parks and sites, where feasible and examine the potential effectiveness of a system wide EMS.
- Continue efforts to replace or upgrade water and wastewater infrastructure.
- If the federal Land and Water Conservation Fund is fully funded establish guidelines to allow for use of a portion of these funds for Missouri state agency projects
- Clarify and enhance the working relationship between the State Park Foundation, other friends groups and non-profits.
- Evaluate the continuation of youth offender camps in State Parks.

Seek means to provide the needed Information Technology infrastructure, including GIS systems, in the system so operations progress efficiently to meet both visitor needs and the mission to preserve natural and cultural resources.

### Objective

Increase State Park system opportunities offered to residents of St. Louis and Kansas City areas by a minimum of three new opportunities annually by the end of 2006.

	2001	2002	2003	2004	2005
New State Park opportunities in St. Louis	3	3	4	3	7
New State Park opportunities in Kansas City	1	1	0	0	6

St. Louis area:

- Route 66 State Park has a new equestrian parking area completed in June 2005.
- Scott Joplin State Historic Site has added programming so that there is one event every month. The new programs this past year are as follows:
  - March 2005 - Sue Keller presented a Master's Class on Ragtime and accompanying concert.
  - April 2005 - Tichenor Family Five in Concert
  - April 2005 - New Outreach Program for Preschoolers was presented
  - June 2005 - Nora Hulse presented "Women in Ragtime"
  - July 2005 - Soule-Greg Wilson presented a Post-African Bango and Drum Seminar and Concert
  - October 2005 - St. Louis Ragtimers Performed in Concert

Kansas City area:

- 3 school groups;
- one civic group
- Trash Day and Scout Day

#### Strategies

- Partner to better preserve the archaeological sites of indigenous peoples located throughout the state and in urban areas, such as those within Kansas City's Frank Vaydik Line Creek Park.
- Work with non-profit groups in St. Louis to expand recreation and interpretation opportunities along the Missouri and Mississippi rivers.
- Evaluate the effectiveness of urban area management of all State Parks and historic sites in St. Louis to determine whether it should be replicated in the Kansas City area.
- Expand participation in the Urban Population Outreach Program in Kansas City, Joplin and St. Louis in cooperation with the Missouri Parks Association.
- Expand the Wonders of the Outdoor World National Outdoor Recreation and Conservation School to the Kansas City area.
- Expand programs offered at the Scott Joplin House State Historic Site in St. Louis and the Bruce R. Watkins Cultural Heritage Center and Museum in Kansas City.

#### Objective

Increase trail opportunities within the State Park system by expanding the trails system by 5 percent.

Increase trail opportunities within the State Park system by expanding the trails system by 5 percent.				
	2002	2003	2004	2005
Percentage of miles of trails increased	0.00%	2.19%	0.31%	1.87%
Miles of trails in State Parks	960	981	984	1,002.75

There are numerous variables that affect how and when we complete trail projects. Budget constraints from park to park, prioritization of projects (at both the park level and statewide) create delays. When completed, these projects will total almost 50 miles.

#### Strategies

- Make the Katy Trail State Park a cross-state trail by connecting the trail with the network of trails in the Kansas City area.

- Continue participation in interstate and national discussion groups to examine ways to develop ongoing partnerships with public agencies and private organizations in support of National Historic Trails.

#### Objective

Maintain a high level of visitor and resource protection in Missouri's State Parks and historic sites.

<b>Innovative protection in the State Park system</b>				
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Number of rangers assigned to bicycle patrol	16	18	23	32
Percent of parks or sites participating in Campground Watch Program	37%	37%	37%	63%

One of the goals of the Missouri State park system is to provide a safe and enjoyable recreational experience for all of our park visitors. Although state parks are safe places to visit, crime may occur such as a theft. Park thefts represent a loss of not only property, but of pleasure and enjoyment. The Campground Watch Program, now has been expanded to Park Watch Program, is an effort by the state park rangers to inform visitors of a few simple precautions they can take to help reduce their chance of personal loss and to help keep the parks a safe and enjoyable place to visit.

#### Strategies

- Continue the division's Community Policing initiatives and the Campground Watch Program, increasing participation to 75% percent by 2007
- Maintain a healthy and diverse State Park ranger program.
- Continue to monitor water and wastewater systems for security, operations and maintenance to assure correct operation.

## Preservation of Missouri's Significant Cultural Heritage

### Objective

Increase the preservation of Missouri's cultural resources

Documentation of cultural resources in the Missouri State Park System			
	2003	2004	2005
Projects that potentially effect archaeological sites	404	469	475
Number of decreased threats to cultural resources	100	65	123
Percentage of properties surveyed of those reviewed	14%	16%	32%
Number of cultural resources assessments and treatment projects	14	21	37
Number of completed cultural resource management plans	3	1	1
Percentage of artifacts entered into automated cataloging system	32.0%	35.8%	37.8%
Number of archaeological properties identified and evaluated	404	469	475

### Strategies

- Document and evaluate threats to cultural resources to seek means to reduce the deterioration of these resources.
- Provide greater interpretation of minority or under represented historical and cultural themes.
- Work with partners in the redevelopment of the Missouri State Penitentiary in Jefferson City, the oldest prison west of the Mississippi River.
- Strengthen relations with tribal governments through consultation about State Parks, interpretation and repatriation.
- Increase the number of potential archaeological properties evaluated
- Increase the percentage of State Park artifacts fully documented within the automated cataloging system
- Conduct 8-10 formal assessment and conservation treatment projects annually that preserve significant cultural resources
- End the use of historic Babler Lodge by the Division of Youth Services.

## Preservation of Missouri's Significant Natural Heritage

### Objective

Decrease the threats and increase the preservation of native species and environments in State Parks.

Number of acres preserved in the State Park system			
	2002	2003	2004
State Parks acres in Ecological Stewardship Areas	67,167	67,687	68,117
Acres designated as Natural Areas and Natural Heritage Sites	16,500	16,591	17,021
Threats reduced through land acquisition (threats such as noise pollution)	10	15	9
Number of acres acquired that reduce threats to watersheds or habitats	367	280	71

Data are collected by calendar year; therefore, 2005 numbers are not yet available.

### Strategies

- Update the State Parks Threats Study by 2007 to reassess the situation especially related to air, water, light and noise pollution and adjacent development. Develop measures to document trends.
- Participate in the Missouri Bird Conservation Initiative and the Important Bird Area project.

### Objective

Increase the quantity of State Park lands zoned for preserving Missouri's natural heritage themes, native species and environments

Increase the quantity of State Park lands zoned for preserving Missouri's natural heritage themes, native species and environments; and expand planning efforts for them			
	2002	2003	2004
Percent of natural landscape themes in State Parks	65%	72%	72%
Percent of natural landscape regions in State Parks	79%	84%	84%
Percent of Missouri's rare and endangered species found in State Parks	21%	22%	22%
Percent of Missouri's land area in State Parks	0.31%	0.31%	0.31%
Number of biological inventory and monitoring programs completed	74	65	70
Total number of acres managed by prescribed fire	31,592	31,808	31,885
Number of acres added to the division-wide prescribed fire program	970	216	77
Number of acres prescribed burned on State Park lands in the post-fire season	7,937	11,160	6,089

### Strategies

- Make natural resource data available to managers and the public by adding to the number and scope of biological inventory and GIS databases.
- Preserve and restore natural environments through prescribed fire, ecosystem restoration, exotic species control or other means.

- Expand the science and technical program necessary for the good care and maintenance of these natural environments.
- Protect the biodiversity found within Missouri's State Parks through the ongoing efforts of staff and volunteers, as well as visitors.



## Interpretation of Missouri's Natural and Cultural Resources

### Objective

Increase the opportunities for interpretation of Missouri's natural and cultural resources

Interpretation of natural and cultural resources in the State Park system				
	2002	2003	2004	2005
Number of interpretive programs presented	29,307	29,555	40,014	48,998
Percent of visitors participating in interpretive programming *	9%	9.3%	8.63%	8.16% **
Percent of visitors surveyed who were satisfied or very satisfied with interpretive programming ***	N/A	N/A	N/A	99%

\* Calendar 2005 through the end of October 2005

\*\* New reporting methods are gathering more accurate data and eliminating some of the estimates used in past years. Several positions were also eliminated during 2005. This percentage represents 1,307,735 visitor contacts made for year to date 2005 (January through October). On average, this is over 5,000 visitor contacts for each full time and seasonal interpreter in the Missouri State Park system.

\*\*\*This is a new measure for 2005.

### Strategies

- Continue coordination of the Lewis and Clark Bicentennial through 2006, including the last National Signature Event in St. Louis.
- Complete the work of the Interpretive Themes Taskforce resulting in recommendations. Develop an action plan to implement approved recommendations that includes who, what, when and the deliverable product.
- Make sure that Missouri is represented on the national commission to keep us in the forefront of the funding and activities surrounding the 150<sup>th</sup> commemoration of the Civil War.
- Maintain staff and budget commitment to the Civil War marker program, events and publications.
- Complete Native American exhibits in the new visitor center area at Van Meter State Park.

## Public Service

In order to meet our mission to preserve, protect, restore and enhance Missouri's natural, cultural and energy resources, analysis and assistance must be provided to anyone desiring it, and information provided to serve as the basis for sound decision making. These services are often not strategic, but rather sound business practices. Nonetheless, public service is the cornerstone for the department in its endeavor to perform with integrity and excellence in all we do.

### Objective

Maintain assistance for water, air land, natural and cultural resources, energy and state park issues.

### Strategies

- Offer one on one assistance through the department's ombudsmen to communities, the public and businesses to more proactively address problems before they become major issues.
- Continue efforts to grow a workforce for the department that reflects Missouri, including minorities, women, disabled and veterans.
- Continue to fully participate in disaster training drills.
- To enhance environmental compliance, offer permitted facilities an Initial Assistance Visit to go over permit specifications, view the operations, and answer questions. Preventing problems early and helping to gain understanding of requirements will both protect the environment and assist businesses at the least costly time.

### Objective

Increase the use of electronic medium to automate the permitting process, make more information available on the Internet, and to integrate the many department databases .

### Strategies

- Implement use of automated permit applications for quicker turnaround time of permit approval.
- Enhanced use of electronic and Internet resources through an automated permitting processes and increased availability of operational information such as permitting, inspection and enforcement manuals on the Internet. This access to information is for the public to understand the breadth of our work , regulated entities to understand our processes and their requirements, and our staff to have more ready access to needed materials.

## Other Department Strategic Initiatives

### Public Drinking Water

The percent of Missourians served by community water systems that meet federal Safe Drinking Water Act standards.											
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Percent of Missourians Served	95.9%	95.9%	96.5%	96.0%	96.2%	97.7%	95.0%	95.0%	95.0%*	93.0%	N/A
For comparison											
Nation-wide	84.1%	86%	87%	89%	91%	91%	91%	94%	90%	91.4%	N/A
Data captured and reported on a calendar year basis * Decreased compliance in 2004 is due to new federal regulations going into effect (disinfection byproducts, surface water treatment rule).											

Public water systems in Missouri			
	2003	2004	2005
Community public drinking water supplies	1,466	1,443	1,471
Non-community public drinking water supplies	1,337	1,225	1,256
An example of a community public drinking water system is a city's drinking water system. An example of a non-community drinking water system is a restaurant using a its own well for its drinking water source. Data collected on a state fiscal year basis.			

In 2004, 95% of the 2,668 public drinking water systems in Missouri were in compliance with health based standards. Systems not in compliance are typically small community or non-community systems (such as trailer courts, schools or restaurants not on a city's drinking water system) each serving a small percentage of Missouri's population. The department will be focusing both assistance and compliance efforts on these smaller systems to ensure that all Missouri citizens drink water that is safe.

Our overall high compliance rate can largely be attributed to our good quality groundwater. Most of our water is not naturally corrosive so issues related to lead and copper pipe that have created problems in other parts of the country have not been a problem here. Nitrates and pesticides are not yet getting into the deep groundwater used by public water systems.

#### Small drinking water systems

The development of small subdivisions also poses a risk to drinking water quality. Developers of some subdivisions plan their developments so that each drinking water source serves less than 15 connections or 25 people, thus avoiding regulation as a public drinking water system. The construction and operation of the water system and the quality of drinking water provided to the persons living in those developments are not regulated, which may compromise public health. Also, if or when the subdivision grows to the point of meeting the definition of a public water system, the homeowners

association or other responsible party – but not the developer – become subject to the drinking water law and regulations and may be liable for costly repair of the system or treatment of the water to ensure that safe water is provided.

#### Drinking water security

There has been an added emphasis on the safety of our drinking water supply, particularly in the wake of the tragic events of September 11, 2001. There is a need for funding to public water systems to design and construct enhanced security facilities and systems. Ensuring the security of sensitive drinking water system information provided to the state continues to be a challenge. Improvements in Missouri's Sunshine Law to provide these protections, particularly for information provided by privately owned public water systems, are still needed.

### **Permitting, compliance assistance, inspection and enforcement**

#### Objective

Increase compliance of public drinking water systems from 87% in 2004 to 90% in 2007 for health based standards and from 65% in 2004 to 75% in 2007 for all applicable state public drinking water regulations.

<b>Percentage of permitted public drinking water supply systems in compliance with all state public drinking water health standards and safe drinking water regulations, including monitoring and reporting</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>
Compliance with health standards	85%	87%	N/A
Compliance with drinking water regulations	63%	65%	N/A

<b>Percentage of permitted public drinking water supply system enforcement actions resolved by the Public Drinking Water Branch</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>
Number of enforcement actions*	98	76	63
Number resolved**	73	54	51
Percent resolved	74%	71%	81%
* includes bilateral compliance agreements, negotiated settlement agreements, administrative orders, variances/exemptions, and referrals to AGO or EPA			
** cases resolved may, in fact, have been initiated in a previous year so may not match exactly with cases initiated in the same year			

#### Strategies

- Evaluate the resources needed in coming years to implement the drinking water program and involve stakeholders in the determination of any fee recommendations. The current primacy fee on community public water system customers sunsets on September 1, 2007. The fee supports public drinking water quality efforts.

### Objective

Maintain registration of property constructed wells.

	2003	2004	2005
<b>Properly drilled wells</b>			
Domestic wells	6,857	6,147	5,649
Monitoring wells, heat pumps, test holes and underground injection wells properly drilled	1,589	1,513	1,614
<b>Permitted installation contractors</b>			
Water well contractors	529	537	493
Monitoring well contractors	731	751	730
Heat pump contractors	277	288	268
Pump contractors	947	962	892

### Strategy

- Continue to work jointly with the well drilling community to implement use of Global Positioning System (GPS) and other electronic means of reporting well locations.

### Objective

Maintain certification efforts for all types of well drillers and pump installers.

	2002	2003	2004	2005
Water well installation contractors	527	529	537	493
Monitoring well installation contractors	694	731	751	730
Heat pump installation contractors	226	277	288	268
Well pump installation contractors	939	947	962	892

### Strategy

- Working with the Missouri Water Well Drillers Association and others such as the Missouri Rural Water Association, strengthen the law to protect against unpermitted drillers or pump installers and to find solutions to deal with the over 300,000 abandoned, unplugged private wells in Missouri.

## Airborne Lead

Airborne lead poses the greatest danger to children under age 6, and the federal air quality standard for lead focuses on protecting this group. Low doses damage the central nervous system of children and unborn infants, causing seizures, mental retardation and behavioral disorders. In children and adults increased blood-lead levels also cause fatigue, disturbed sleep, decreased fitness and damage to kidneys and liver.

In Missouri, a large amount of airborne lead comes from lead smelters. Historically, air monitors located near Missouri's primary lead smelters often recorded very high ambient lead concentrations, even as high as 12 times the National Ambient Air Quality Standard (NAAQS) for lead. Airborne lead can fall to the ground and be deposited on buildings, the ground, roads and other surfaces. While the long-term trend of reductions in lead emissions in Missouri certainly is encouraging, there continue to be health concerns near the Doe Run Company's lead smelter in Herculaneum.

Air monitors in Herculaneum recorded no violations of the NAAQS for lead for ten consecutive calendar quarters, but violations were recorded again for the first three quarters of 2005. These violations were recorded even though the plant was not being operated at full capacity. The first violation triggered a set of contingency projects, but Doe Run had already completed installation of the required emission control projects. The second violation triggered a production limit of 50,000 tons of finished lead per calendar quarter. These contingencies have proven to be insufficient to maintain the NAAQS and staff is working with the company to identify and develop additional emission control measures to remedy these violations.

In late August 2001, lead-bearing materials were discovered on the city streets of Herculaneum, the route that the Doe Run company uses to haul lead concentrates into the plant. The contamination decreased with distance from the plant. This material likely fell off the tires and tailgates of trucks as they left the plant. This lead may have become airborne as vehicles drove over it.

The State of Missouri and the EPA ordered Doe Run to clean up the streets and take measures designed to address spillage of materials from transportation and handling. The situation has improved, but the EPA and the department continue to work with the company on their materials transportation and handling.

<b>Highest quarterly averages nearest Missouri's primary lead smelter facilities (ug/m<sup>3</sup>). Values in bold exceed the federal standards for airborne lead.</b>								
	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b> *	<b>2005</b>
Glover Big Creek	0.90	1.10	1.00	1.20	1.00	0.70	0.02	0.10
Herculaneum Broad Street	11.60	10.40	6.90	9.10	2.20	1.50	1.40	1.90
The National Ambient Air Quality Standard for lead is 1.5 ug/m <sup>3</sup> averaged over a calendar quarter.								
*Doe Run suspended operations indefinitely at its Glover facility in winter 2003 for economic reasons.								

## **Regional haze**

The department's Air Pollution Control Program is a founding member of the Central States Regional Air Planning Association (CENRAP), an organization of states, tribes and federal agencies. The organization was chartered to carry out activities associated with the management of regional haze and other air quality transport issues involving the central states. CENRAP is one of the five Regional Planning Organizations across the U.S. and includes the states and tribal areas of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma, and Texas.

The states and tribes in this region formed this association in response to federal Clean Air Act requirements to improve the visibility in Class I Wilderness Areas. Class I areas are areas of special national or regional natural, scenic, recreational, or historic value for which the Clean Air Act Amendments of 1977 afford the highest level of protection from air pollutants. Two are located in Missouri; Mingo Wilderness Area (approximately 8,000 acres) about 20 miles southwest of Poplar Bluff and Hercules Glade Wilderness Area (approximately 12,300 acres) about 35 miles southeast of Springfield. State Implementation Plans for these areas must be submitted in 2008 that provide for improvement of visibility to natural background conditions by 2064. There are also requirements for intermediate progress reports and State Implementation Plan revisions.

A variety of air pollutants contribute to visibility impairment. Small particles cause most of the impairment in the atmosphere. In Missouri, sulfates and nitrates, by-products of fossil fuel combustion, are the dominant sources of visibility impairment. Some of the fine particles are released directly, but most of the particles are formed in the atmosphere as the product of chemical reactions. Sources of haze-causing pollution include electric power generation, industry, automobiles and trucks, agricultural and forest burning and many other activities.

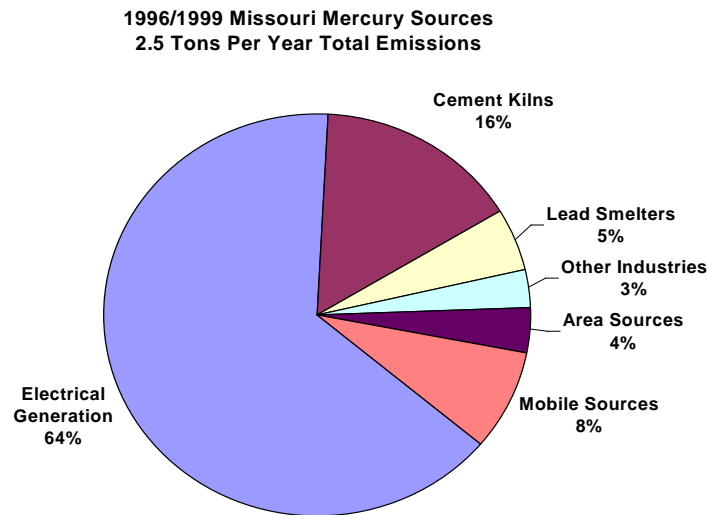
These small particles, and their gaseous precursors, can be transported great distances affecting visibility over hundreds of miles. Because of this, visibility impairment does not respect state boundaries, and is a regional problem. EPA recognized this by encouraging states to form regional planning organizations.

The primary role of CENRAP is to coordinate the science and technology decisions that will be needed to support air quality management decisions. CENRAP functions through organized workgroups comprised of members from the states and tribes along with representatives of federal agencies, stakeholders and other interested parties. The department is actively participating in the Emission Inventory, Modeling and Implementation and Control Strategies workgroups. Other workgroups include Monitoring, Communications and International Issues.

## Mercury

Atmospheric emissions of mercury fall into three categories:

- Natural emissions -- the release of mercury by natural processes, such as volcanoes, "degassing" of the earth's crust and microbial-mercury interactions in soils and sediments.
- Anthropogenic emissions -- the release of mercury by human activities.
- Re-emitted mercury -- the transfer of mercury to the atmosphere by biologic and geologic processes, drawing on a pool of mercury that was deposited to the earth's surface after initial release by either human or natural activities. Recycling of mercury at the earth's surface, especially from oceans, extends the impact and range of emissions over time.



Coal-fired electric power plants are the largest remaining industrial source of mercury air emissions in the United States. Strategies for making significant reductions in mercury emissions from coal plants include: increased development of energy efficiency and renewable energy resources; switching fuel sources from both higher to lower mercury-containing coal and from coal to natural gas; and end-of-the pipe control technologies such as wet scrubbing systems, activated carbon injection and carbon filter beds.

The EPA promulgated a final rule on May 18, 2005, establishing standards of performance for emission of mercury from new and existing coal-fired electric utility steam generating units. The rule creates a market-based cap-and-trade program that will permanently cap mercury emissions from coal-fired power plants. The final rule included new source performance standard for sources constructed, modified, or reconstructed after January 30, 2004, and emission guidelines for existing sources. The department's Air Pollution Control Program will implement the emission guidelines under a State Implementation Plan-like process.



## Coordination, design and implementation of air pollution reduction strategies

### Objective

Improve air quality to attain the federal lead standard in Herculaneum.

### Strategies

- Continue work with stakeholders in industry and environmental groups to find common-sense ways to reduce regulatory burden and costs without sacrificing air quality
- Continue work to decrease lead in the environment in Herculaneum. Work with other agencies to ensure health risks are being addressed.
- Continue to work with Central States Regional Air Planning Association and EPA to determine how we will meet goals for Regional Haze.
- Monitor and participate in federal mercury rulemaking efforts.

## Permitting, compliance assistance, inspection and enforcement

### Objective

Maintain compliance with air quality standards.

### Strategies

- Ensure new and existing stationary sources of air pollution comply with rules designed to decrease air pollution while maintaining maximum employment and full industrial development of the state.
- Continue to ensure permitting decisions are based on valid scientific information and supported by law and regulation.
- Continue to work with stakeholders to find process efficiencies.
- Continue compliance assistance including initial assistance visits to newly permitted facilities or those that have never had an inspection.

Average days for construction permit issuance								
1997	1998	1999	2000	2001	2002	2003	2004	2005
94	76	66	60	72	59	52	58	55

Data for large sources holding permits			
	2003	2004	2005
Sources	6900	6900	7127
Inspections	1679	1395	1065
NOVs	495	456	307
Settlements	161	99	98
Referrals	13	7	4

## Hazardous Waste

Management of hazardous wastes in Missouri						
	2000	2001	2002	2003	2004	2005
Hazardous waste recycled, reused or recovered	34%	34%	31%	29%	32%	
Hazardous waste disposed of	66%	66%	69%	71%	68%	

More than 70,000 chemicals are used regularly around the world. That's a staggering number when you consider the potential health consequences associated with many of these chemicals. Manufacturing processes using chemicals create most hazardous waste as a by-product— material left after products are made. Some hazardous wastes also come from our homes, including items such as old batteries, bug spray cans and paint thinner.

In order to protect human health and the environment, Missouri adopted a “cradle-to-grave” hazardous waste management system where wastes are regulated from the point where they are first created (“cradle”) until they reach final disposal (“grave”). This affects everyone who handles a hazardous waste throughout this life cycle, including thousands of Missouri hazardous waste generators, transporters, and facilities that treat, store or dispose of hazardous waste. The department protects human health and the environment through permitting, inspection and enforcement activities.

### Lambert Airport

The City of St. Louis owning Lambert Airport and Boeing are seeking solutions to the cleanup of contamination at their facilities. The department has attempted to mediate the concerns of Boeing and the City by soliciting input on current and projected future land uses and facilitating dialogue between the two entities. The department believes that safe, beneficial reuse of the site is possible and will continue to work with both parties towards that end. To achieve this, the department will insure that Boeing cleans up the property to risk-based levels appropriate for reasonably anticipated current and future uses of the property. This will include an ongoing long-term stewardship program that requires institutional and engineering controls to ensure that unacceptable exposures to residual contamination on the property do not occur. It must also include a plan and dedicated resources to insure that these controls remain in place and effective.

### Contaminated land

Hundreds of hazardous waste sites in Missouri require cleanup. A considerable amount of Missouri's natural resources have been contaminated with hazardous materials from mining, smelting, manufacturing, light and heavy industry, service-oriented businesses, military and other governmental activities. Even a tiny amount of some hazardous materials can cause serious health concerns for Missouri citizens and damage a relatively large amount of air, land, water and groundwater resources. Impacts can cover small and large tracts of land (less than an acre to hundreds of square miles). Cleanups can also be very complicated and take many years to achieve an acceptable level for reuse of the land. Cleanup efforts can be made even more difficult by contaminants not yet fully researched or regulated.

### Superfund

In 1980 Congress established the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), known as Superfund. The law provides for the clean up of contaminated soil and water that poses a threat to human health and the environment. The federal law provides both response and funding mechanisms for the cleanup of hazardous substance disposal sites. The federal law also requires that past polluters (responsible parties) pay for the cleanup.

In 1983, the Legislature enacted the Missouri Superfund law. It established emergency response for hazardous substance releases, it created a funding mechanism to finance the state share of investigation and site cleanups, and it directed the department to prepare a Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri.

The first step is the investigation of potential hazardous waste sites. Some sites contain hazards that need to be removed immediately in order to protect people or the environment. Other sites contain hazards that allow long term clean-ups. Sites that pose the most significant risk, and will require a long period of time to investigate and remediate, are generally recommended for the [\*National Priorities List \(NPL\)\*](#), EPA's list of the nation's worst hazardous waste sites. Sites are managed either by the department or the EPA. Large sites that are on the NPL or are seriously contaminated often require extensive public input. Currently there are 53 sites in the initial investigation and assessment phase and 26 sites on the NPL.

Generally, once a site is evaluated, the EPA and DNR work together to conduct further investigation and clean-up. The parties responsible for contaminating the site are required to pay for the cost of the cleanup. Some sites have been abandoned, are uncontrolled, or the contamination occurred long ago, and Potentially Responsible Parties (PRPs) can not be determined. If there are no PRPs for a site, federal funding provides 90 percent and state funding 10 percent of the clean-up costs. After sites are cleaned up, groundwater samples are generally taken on a periodic basis and site conditions are monitored to ensure that the cleanup was effective in controlling problems at the site. Currently there are 105 sites in the remediation or removal phase.

The department has established a program to conduct natural resources damage assessments at Superfund sites and to seek compensation for injuries of those natural resources caused by hazardous substance contamination. Responsible parties provide monetary compensation for the injured resources, which are then used to restore the injured resources.

The department is active in cleaning up both federal lead and state lead Superfund sites. The passage of Senate Bill 225 will provide funding for the state's oversight of Superfund cleanups through fees charged to hazardous waste generators and a .50 fee charged on the sale of lead-acid batteries. Senate Bill 225 also set up the process where the 10% state share cost of cleanup will be funded through a specific general revenue appropriation.

### Herculaneum

The Doe Run Company's smelter at Herculaneum is one of the largest primary lead smelters in the world and has operated in Herculaneum for over one hundred years. Significant impacts to air quality, residential properties, water quality, and the ecosystem have been attributed to the historic operation of the smelter.

In 2001, the department and the U.S. Environmental Protection Agency (EPA) finalized a comprehensive Administrative Order on Consent with Doe Run. The Consent Order required Doe Run to:

- Investigate and clean-up all contaminated residential properties;
- Investigate and control ecological and groundwater impacts from a slag pile located in the flood plain of Joachim Creek; and
- Investigate any other areas impacted by operations from the facility.

Significant problems still exist in Herculaneum that require attention. Department staff have studied lead redeposition rates in residential soil and have found that soil will be recontaminated above a health-based standard within one-quarter mile of the smelter within four to ten years. The concentration of lead on roadways, while reduced to 10% of the extreme levels found in August 2001, are still unacceptably high. Doe Run has not found an effective method of transporting lead concentrate into Herculaneum that does not result in contamination of residential streets. A bridge over Joachim Creek that lead concentrate trucks use to reach the smelter has been closed to use by heavy trucks. As a result, lead concentrate trucks must use a non-approved route into town. Maintaining this progress will require a commitment to funding the state's share of cleanups and long-term stewardship costs at sites where contamination is still present. The department is committed to developing a system to record and monitor these contaminated locations and ensure public safety is protected. This system would offer the public access to information about all sites where contamination is present and would protect communities, homes, schools and workplaces from risks posed by these contaminated sites.

### Abandoned Lead Mining Sites

Missouri has historical lead mining in 38 Missouri counties. As cities and communities grow, development on and adjacent to these sites occurs. Residential development in these areas often poses a health risk associated with lead contaminated soil or groundwater when the water is used as a drinking source. Environmental problems such as contaminated sediment and surface runoff degrades stream water quality,

### Methamphetamine Labs

Missouri has become the national leader in the number of meth production facilities seized annually. This insidious problem not only poses a serious health threat to the manufacturers and users, but also puts at risk those living or working in areas around methamphetamine production labs. Through cooperation among local law enforcement agencies, fire departments, the Department of Natural Resources and the Missouri Department of Public Safety, these chemicals are now properly disposed. Between

October 1998 and June 2005, 8,888 methamphetamine labs were cleaned up, with the lab wastes safely delivered at Missouri's clandestine drug lab collection stations. That adds up to more than 356,470 pounds of meth lab chemicals and debris processed and properly disposed of at collection stations. The cost per lab disposal through this effort is approximately \$150. The cost of lab disposal through the federal Drug Enforcement Agency is \$3000.

Number of meth lab seizures brought to lab collection stations					
	2001	2002	2003	2004	2005
Meth lab seizures statewide	2130	2725	2860	2788	NA*
Seizures brought to collection stations	1502	2121	1948	1837	NA*

\*This data is on a calendar year basis, so 2005 data is not yet available.

### Electronics management

The stockpile of used or obsolete electronic products continues to grow. The National Safety Council projects that nearly 250 million computers will become obsolete in the next five years. Computer monitors and older television picture tubes contain an average of four to eight pounds of lead and require special handling. In addition, electronics can contain hazardous metals and brominated flame retardants. Currently, electronic products become hazardous waste when they are discarded. Because of the sheer volume, Missouri must develop an infrastructure capable of managing the reuse and recycling of obsolete electronic products. The department is convening a work group of various stakeholders to develop a plan to deal with e-waste that incorporates product stewardship, market driven approach and clear options for appropriate disposal.

### Electronic distribution of compliance information

Availability of reliable compliance information helps Missouri's hazardous waste generators comply with the state's laws and regulations. Historically, compliance information was available primarily in a paper form. In recent years, the department has made limited information, such as technical bulletins, available on the Internet, but Missouri businesses would benefit from additional compliance assistance information. These businesses would also benefit from the department distributing electronic compliance assistance information through more direct means, such as an email newsletter sent to those who register for the free service.

### Pesticide sites

Facilities that produce, package, and sell pesticides create a unique challenge for the Hazardous Waste Program. When pesticides are no longer useful, they can become hazardous waste. In addition, federal regulations governing the sale of pesticides restrict products from being sold once they have been banned, withdrawn, or misbranded. These restricted pesticides become wastes when they can no longer be used or sold. The large number of available pesticides presents a complex variety of potential hazards, including ignitability and toxicity. Mishandled pesticides can threaten human health and the environment. Also, few pesticide industry representatives have knowledge of hazardous waste requirements.

Recently, department inspectors have identified sites where improperly stored pesticides have threatened public health and the environment. The parties responsible for these locations have not identified the pesticides that are stored. Analysis of the wastes is needed to identify their hazards. These sites pose challenges because of the large amount of waste and uncharacterized nature of the waste. The department believes that many more of these sites may exist in the state. Identification, investigation and cleanup of these sites may be very expensive.

Hazardous waste generators that have not been inspected

Missouri currently has approximately 2,500 registered hazardous waste generators. Nearly half of these have not been inspected since at least 1994. Inspectors visit approximately 400 sites annually. Each year, some generators become inactive and some new generators register with the department. The Environmental Protection Agency require that the department inspect 20 percent of the large quantity generators each year, which limits the number of small quantity generators that the department can inspect. With current budget constraints, the department is challenged to visit all hazardous waste generators on a regular basis.

### Underground storage tanks

Underground tanks used to store petroleum also have posed a threat to Missouri water quality. In 1984, the federal Resource Conservation and Recovery Act established a regulatory program for underground storage tanks. Missouri now has in place programs that register and inspect underground storage tanks and oversee the cleanup of leaking underground tank sites.

During fiscal year 2004 the department issued Missouri Risk-Based Corrective Action for Tank Sites, its first major revision to the petroleum cleanup guidance in more than 12 years. The new guidance provides greater flexibility and more tools for tank owners to clean up sites in accordance with the reasonably anticipated future use of the property. The new guidance is expected to streamline the cleanup process and save state and private cleanup dollars for use at more sites.

The Missouri Petroleum Storage Tank Insurance Fund (PSTIF), administered by the PSTIF board of trustees, helps insure owners and operators of underground storage tanks so that they will have the financial resources necessary to pay for leaks or spills from their tanks should they occur. Since 1992, the fund has insured more than 3,200 underground storage tank sites and 10,000 tanks.

### **Permitting, compliance assistance, inspection, enforcement**

#### Objective

Increase compliance at:

- Hazardous waste permitted facilities from 79.7% to 81% in 2005.
- Underground storage tanks with upgrade and leak detection requirements from 79.5% to 85% by 2005.

<b>Types of hazardous waste facilities in Missouri</b>	<b>2005</b>
Treatment, storage, & disposal sites	100
Resource recovery sites	29
Underground storage tanks (UST) and leaking USTs	3,757
Federal Facility sites	292
Drycleaner sites	337
Brownfields or voluntary cleanup sites	202
Hazardous waste generators	2,488*
Superfund sites	280
Total	7,482

\*Effective 8/29/05 out-of-state generators are no longer required to register with the Hazardous Waste Program

<b>Percentage of hazardous waste facilities in compliance</b>				
	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
Hazardous waste facilities	75.3%	77.4%	71.1%	79.8%
Underground storage tanks with significant operational compliance	98%	97%	91%	79.5%

Percentage of Resource Conservation and Recovery Act (RCRA) inspections* that do not result in issuance of notice of violation			
2002	2003	2004	2005
86.6%	87%	83.8%	84%

#### Strategies

- Develop alternatives that provides for hazardous waste management systems that protects human health, public welfare and the environment, while allowing for economic development and reuse of sites.
- Provide facility and public access through the Internet to needed information and documents to improve permitting procedures.
- Seek better, safer and more convenient methods need to be developed for household hazardous waste disposal to help ensure that products don't make their way into our water resources.
- Find an appropriate funding source(s) to continue operating on-going methamphetamine initiatives such as the Clandestine Drug Lab Collection Station Program.
- Work with the electronics stakeholder workgroup to address including electronics in the state's universal waste rule. Continue to address additional regulatory, consumer, collector, demanufacturer, recycler and transporter issues related to the reuse, recycling or disposal of electronic equipment.
- The Hazardous Waste Program continues to work with responsible parties to clean up pesticide sites. The experience gained through these efforts should help the department effectively identify and address similar sites in the future.

### **Remediation**

#### Objective

Maintain the number of cleanups completed each year at least at 200 per year.

Leaking Underground Storage Tanks				
	2002	2003	2004	2005
Cleanups per year	259	111	96	186
Cleanups complete – sites in long-term stewardship	4254	4515	4613	4736
Cleanups ongoing	1594	1526	1573	1638

Projections indicate that after 2017, cleanups per year will equal new releases.

Projected drycleaner sites cleaned up over life of program	
	2005
Potential sites	167
Potentially funded cleanups - cumulative	0

The number of registered drycleaners in FY 2005 was 334. Of these sites an estimated 167 sites are potentially contaminated. Cleanup is expected to begin in 2006.

#### Strategies

- Continue to coordinate activities of mutual interest among all stakeholders, including Boeing and the City of St. Louis, on property subject to corrective



action pursuant to the hazardous waste permit. In particular, this includes resolution of the issues surrounding long-term stewardship and financial responsibility for future redevelopment related activities on that portion of the permitted property now owned by the City of St. Louis.

- Enforce agreements and permits with Doe Run to improve environmental conditions in Herculaneum.

## Management of Solid Waste

Management of solid waste in Missouri (millions of tons)																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Generated	7.5	7.6	7.8	8.1	8.4	8.6	8.8	9	9.2	9.6	10.28	10.6	10.9	11.27	11.7	NA*
Diverted	0.74	1.4	1.8	2.2	2.8	2.86	3.44	3.52	3.36	3.4	3.92	4.38	4.74	5.03	5.5	NA*
Disposed	6.7	6.2	6	5.9	5.6	5.7	5.33	5.53	5.87	6.15	6.4	6.2	6.2	6.25	6.2	NA*

\*NA 2005 data will be available February 2006

The department works hard to help all Missourians better manage their solid wastes to protect and enhance the public health and environment. Missouri homes, businesses and industry generate millions of tons of solid waste annually. While landfill disposal continues to be an option, new disposal facilities face strong public opposition and are costly to site, build and operate.

The department provides statewide planning and policy development, disseminates information on solid waste management trends and provides advice on waste reduction, reuse, recycling or composting waste to the public. Choosing the best waste management strategies conserves raw materials, energy, landfill space and money. By focusing on alternatives to disposal the number of Missouri communities with access to recycling services has risen from 47 in 1989 to more than 400 in 2004. During that same period, services for yard waste grew from 112 communities to more than 300. These programs made a substantial contribution to the year 2004 landfill diversion rate of 47 percent

The department has the responsibility under the Solid Waste Law to provide engineering oversight and conduct inspections and enforcement for Missouri's 35 active landfills (including sanitary, demolition and special waste landfills) and 50 transfer stations. Transfer stations are solid waste processing facilities where local, short-haul trash collection trucks bring their loads. The trash is consolidated and then taken to a regional landfill.

The department's responsibility also extends to hundreds of old, abandoned landfills scattered across Missouri. These pose a real risk to human health and the environment due to uncontrolled gas migration, groundwater contamination, discharge of leachate to surface water and ground subsidence. Protecting Missouri's citizens and environment from these risks is a continuing challenge, one where the department currently has little authority and no funding.

### Siting of solid waste facilities

The siting of solid waste facilities such as landfills and transfer stations has become increasingly difficult and controversial. While waste generated each year is close to two tons per person, few people want a landfill or transfer station nearby. As a consequence, many localities have zoned their land so that landfills and transfer stations stay outside their borders, and much of Missouri's solid waste is exported to surrounding states

### Illegal dumping

The department works with local officials throughout the state to prosecute illegal dumpers. Surveillance cameras continue to be installed at various illegal dumpsites throughout the state by a department team. Within the last two years, the department has turned over 39 illegal dumping cases to county prosecutors with evidence obtained from utilizing the surveillance cameras. Most dumpers plead guilty when confronted with photographic evidence and are ordered to pay penalties and restitution. Prior to conducting this project, the department had little success identifying parties responsible for illegal dumping. It is difficult to address these situations because illegal dumpers must be positively identified in order to assess penalties and require cleanup. Enforcement on these illegal dumping cases is now proceeding and creating a deterrent.

### **Waste reduction**

#### Objective

Maintain the diversion rate for Missouri's solid waste at least at 45%.

Missouri's solid waste diversion rates															
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
10%	15%	26%	31%	30%	33%	39%	39%	36%	36%	38%	41%	43%	45%	47%	NA*

NA\* This is calendar year data. 2005 data will be in February 2006.

#### Strategies

- Promote the purchase of products made with recovered materials.
- Research and promote feasible alternatives to disposal of wastes in landfills.
- Promote unit-based pricing, also known as Pay-As You-Throw, strategies to encourage additional resource recovery.
- Promote integrated solid waste systems.
- Focus on areas of the waste stream that represent the largest portion, by weight, of waste that is disposed in landfills.
- Assist businesses with their ongoing solid waste reduction or recycling programs to achieve solid waste management goals that conserves raw materials, energy, landfill space and money.
- Continue to work with the Hazardous Waste Program to develop materials and strategies to address regulatory, consumer, collector, recycler and transporter issues related to the reuse or disposal of electronic equipment.

### **Permitting**

#### Objective

Maintain the 100% compliance rate for landfills meeting federal design requirements.

Solid waste management				
	2002	2003	2004	2005
Percent of landfills meeting design requirements of Subtitle D of the Resource Conservation and Recovery Act.	100%	100%	100%	100%

#### Strategies.

- Work with applicant to address permitting requirements as solid waste management in Missouri moves to larger area wide landfills with additional transfer stations.
- Continue the proper siting of landfills through site specific investigations.
- Coordinate with the Division of Geology and Land Survey to ensure that landfills are designated and constructed appropriately.
- Promote public awareness and community involvement in the locating of landfills through meetings held during the initial permitting process. This provides an opportunity and greater role for groups or individuals that may be potentially impacted by a landfill in their area.

### **Compliance assistance, inspection and enforcement**

#### Objective

Minimize the amount of improperly disposed solid waste

<b>Investigation and enforcement activities</b>				
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Complaints investigated	488	424	429	430
Illegal dumps closed as result of regional and central office oversight	132	198	146	150

<b>Waste tires cleaned up</b>				
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Tires cleaned up	977,331	1,670,133	891,860	622,422
Number of sites	35	76	96	45

#### Strategies

- Continue the successful surveillance program to identify people who illegally dispose of solid wastes.
- Develop and promote economical and convenient solid waste management services accessible to all Missourians.
- Promote local programs that discourage illegal dumping in order to prevent future cleanups of such sites.
- Work with counties and cities with active programs to discourage illegal dumping.
- Provide all Missouri citizens compliance assistance to ensure compliance. Offer Initial Assistance Visits to newly permitted transfer stations.
- Continue to wisely utilize resources that provide for the clean up of waste tires improperly disposed of in Missouri.

### **Financial assistance**

#### Objective

Maintain the cost per ton of solid waste diverted from landfills through DNR grant programs at or below \$40 through 2007.

<b>Performance of state project grants in cost-effective diversion of waste from landfills</b>							
	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Tons diverted	56,616	36,839	13,879	12,825	33,349	48,644*	143,642
Grant awards (\$millions)		2.2	.89	.80	1.2	1.56	2.07
Cost/ton diverted	38.4	59.8	63.9	62.2	36.0	32.14	14.38

\*For FY2004, 19 State projects complete, 13 projects still active. Additional diversion is expected.

\*\*No new State project grants were awarded after FY2005. It is anticipated that all FY05 State project grants will be complete by end of FY07

<b>Performance of Solid Waste District grants in cost-effective diversion of waste from landfills</b>							
	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Tons diverted	60,000	87,433	141,710	69,990	102,506	50,313*	113,271
Grant awards (\$millions)	2.43	3.19	3.39	3.37	4.55	3.68	4.53
Cost/ton diverted	40.59	36.43	23.93	48.09	44.38	73.21	40

\*For FY 2004 many district grants are still active. Additional diversion is expected

### Strategies

- Provide oversight to assure grant funding is achieving additional waste reduction.
- Assist local solid waste management districts build effective grant review practices to achieve solid waste management goals.
- Research and promote cost effective alternative waste reduction methods.

## Surface Mining and Reclamation

<b>Total land reclamation through land reclamation permits by commodity (cummulative as of 2005)</b>			
	Acres affected (all under regulation)	Acres reclaimed	Percent reclaimed
Coal	20,028	12,195	60.89%
Industrial minerals	48,605	22,329	45.94%
Metallic minerals	4,602	44	0.96%

<b>Total reclamation of mined lands including abandoned mine lands</b>				
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Cumulative mined acres reclaimed	91,872	92,940	93,840	94,740
Mined acres	198,918	199,871	208,774	212,923

Although coal mining in Missouri has decreased in recent years and current mining is closely regulated, the need to reclaim any land previously disturbed by strip mining remains. The department has worked diligently with communities and businesses to clean up these mines. In fact, more than 96,000 acres will have been returned to productive use by the year 2007.

The department ensures the safe and environmentally sound mining and reclamation of all industrial minerals surface mining activities. The most common mined industrial minerals are limestone, clay and sand and gravel. Lesser known industrial minerals mined in Missouri are barite, tar sands, shale, oil shales, sand and granite. There are nearly 900 individual mine sites in Missouri. Approximately 400 permit applications of various types for these mine sites are submitted each year.

The department also coordinates the implementation of the Metallic Minerals Waste Management Act for lead, iron, zinc, copper, gold and silver. Activities include the handling of materials such as waste rock, topsoil, vegetation on the areas of waste storage, but does not include any of the areas associated with the metals mining areas such as vertical shafts, shop areas or the smelting facilities themselves. Environmental issues addressed include erosion by wind or water, sedimentation of materials or disturbance of ground outside the permitted area, and groundwater quality.

### Active Coal Mining

Beginning January 1, 2006, Missouri will once again manage the Missouri Coal Regulatory Program. The program reviews and issues all new permits, revisions and renewals; determines performance bond amounts and makes decisions on requests for bond release; conducts inspections of all coal mining and reclamation operations; and cites violations when necessary. The Department of Natural Resources continues to inspect and reclaim mine sites if the operator's permit has been revoked and reclamation must still be completed with bonds forfeited by the company. Missouri currently has about 8,000 acres of coal mine land, both active and forfeited, that require monthly inspections.

### Abandoned Mined Lands

Missouri has regained eligibility for Abandoned Mine Land funding from the US Department of the Interior, Office of Surface Mining. Missouri has received \$1.5 million per year for these activities from 1990 to 2003, with some larger awards in earlier years. This funding provided the cleanup monies for historic coal mining sites in Missouri, as well as some lead mine open shaft closures. The program temporarily lost funding in fiscal years 2004 and 2005 when general revenue funding for the coal regulatory program was not appropriated.<sup>2</sup> While the program does not receive general revenue, other state funds are now used to provide the required match for the regulatory program.

The department focuses reclamation on high priority sites. These are sites that pose the greatest risk to public health or the environment. The above chart summarizes the work completed and work remaining for priority 1 sites with extreme danger to human health, safety and general welfare and priority 2 sites with serious danger to human health, safety, and general welfare.

High priority abandoned mine land reclamation problems					
	Problems reclaimed	Problems not reclaimed	Total problems	Total Costs Incurred	Projected Total Costs
Clogged streams (miles)	11	2	13	\$595,997	\$ 700,201
Highwalls (feet)	73700	31510	105210	\$ 5,215,587	\$9,086,240
Dangerous impoundments	6	2	8	\$1,051,615	\$1,063,615
Hazardous facilities	28	9	37	\$443,211	\$487,891
Hazardous water bodies	11	7	18	\$485,512	\$700,113
Open portals	35	15	50	\$42,620	\$120,620
Polluted water	34	9	43	\$14,881,790	\$15,310,510
Polluted drinking water	16	5	21	\$3,999,410	\$6,435,619
Vertical openings	190	35	225	\$769,521	\$962,621
Clogged lakes (acres)	1598	16	1614	\$8,580,216	\$8,725,148
Dangerous piles & embankments (acres)	634	177	811	\$7,600,829	\$12,412,701
Industrial/residential waste (acres)	71	30	101	\$305,790	\$370,990
Subsidence (acres)	4	631	635	\$966,519	\$29,286,519
Mine fires (acres)	26	0	26	\$163,332	\$163,332
				\$45,101,949	\$85,826,120

### Mine shafts

Underground mining is accessed through mine shafts used to hoist personnel, equipment and mineral ore from the subsurface mine to the surface processing area. When the mining is complete, the mine shaft should be closed properly for safety reasons and to protect groundwater. Open mine shafts can contaminate drinking water by allowing surface contamination (petroleum, solvents, etc.) to directly enter a groundwater aquifer.

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<sup>2</sup> Abandoned Mined Land funds are 100% federal funds, as long as the state implements an active coal mining regulatory program with a 50:50 state and federal match requirement.

They also allow groundwater in a contaminated aquifer to move quickly to an uncontaminated aquifer.

The real problem is found with the historic mine shafts closed years or decades ago before mining laws even required closure at all. As a result Missouri potentially has several thousand abandoned mine shafts around the state, primarily the southern part of the state, where people may fall into an abandoned open mine shaft. Very little is really known about past mining. Missouri maintains a database of information that indicates up to 5000 underground mines operated at one time in Missouri. Every underground mine had at least one opening into it and many have several.

While the department has been able to address mine shafts, there is also much work remaining that does not have a source of resources to support it. There is no money available, for example, for reclamation of old lead mine sites created prior to permits.

### **Permitting, compliance assistance, inspection, enforcement of industrial minerals and metallic minerals mining**

#### Objective

Provide technical assistance to industrial and metallic mineral mining companies and ensure proper permitting and inspection of facilities.

<b>Permitting actions concerning mining in Missouri</b>				
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
<b>Industrial minerals</b>				
Number of sites	927	907	830	873
Number of permits	370	359	316	359
Numbers of inspections	192	130	227	290
Enforcement taken	39	22	11	12
AGO referrals	10	6	1	2
<b>Metallic minerals</b>				
Number of sites	11	11	11	11
Number of permits	11	11	11	11
Numbers of inspections	35	16	22	22
Enforcement taken	4	0	0	1
AGO referrals	0	0	0	0

#### Strategies

- Strive to respond to citizen complaints about mining within 30 days of receiving the complaint.
- Ensure reclamation is possible at mined sites even if the mining company defaults on reclamation responsibilities through adequate bonding provisions.
- Issue quarry permits in a reasonable and responsive time frame while allowing sufficient opportunities for public involvement.



## Abandoned mine land reclamation

### Objective

Protect public and landowner safety and return land to productive use for the future.

Abandoned mine land reclamation				
	2002	2003	2004	2005
Acres reclaimed	105	43	38	75
Open mine shafts reclaimed	11	24	18	25
Construction cost	\$1,153,148	\$ 514,221	\$ 611,738	\$1,244,621
Federal grant received	\$1,500,000	\$1,500,000	\$0	\$0

### Strategy

- Reduce legacy mining hazards that could harm the public or cause environmental degradation.

## Dam safety

Protecting the people and infrastructure downstream of regulated dams in Missouri continues to pose challenges as well. Missouri contains approximately 650 privately owned dams over 35 feet in height. Approximately 50 of these dams are exempted from Missouri's Dam Safety Law because they are used primarily for agricultural purposes or are regulated by other state or federal agencies. The challenge of ensuring that these dams are properly maintained is both an environmental and human safety issue.

### Objective

Increase compliance of regulated dams from 78% in 2004 to 96% in 2006.

Compliance for regulated dams				
	2002	2003	2004	2005
# of regulated dams	589	590	590	599
# of regulated dams in compliance	555	563	462	541
% of regulated dams in compliance	94%	95%	78%	90%
# of inspections	240	241	23	199
Dams with defects	19	12	68	72
Compliance agreements reached	17	11	63	71
AGO referrals	2	1	5	1

### Strategies

- Develop a newsletter for dam owners to help them better understand their obligations as a dam owner.
- Conduct yearly training sessions for dam owners on pertinent subjects related to their dam.

## Assessment of Land Resources

### Land survey corner restoration and maintenance

The United States Public Land Survey began in Missouri in 1815. By the 1960's it was estimated that 90 percent of the nearly 250,000 original corners were destroyed or obliterated. Since 1970, the department has been involved in the restoration of land survey corners.

Another responsibility of the Land Survey Program is to enhance the Geodetic Network in Missouri. This network has very accurate survey monuments located in every county. In the past, network monuments were far apart, destroyed or unavailable for use, as they were located on private land. Since 1986, the department has worked on many cooperative projects to establish and increase this network of survey monuments referred to as Geographic Reference System stations. They are very accurate and have latitude, longitude, elevation and state plane coordinates for each monument.

### Objective

Increase restoration of land survey corners from 34.5% in 2004 to 37.5% in 2007 (approximately 500 corners per year replaced) and the coverage of Geographic Reference System stations from 35.2% in 2004 to 52.2% in 2007.

	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Corners restored cumulatively	32.6%	33.6%	34.5%	35.5%
Corners restored annually	565	472	502	500
Survey records	22,168	21,657	28,266	22,000
Orders for survey records	2,569	2,487	2,844	2,600

	Stations per year	Cumulative total	Square miles/ year	Cumulative square miles	Percent Coverage
<b>2002</b>	121	1,945	3,670	16,880	24.2%
<b>2003</b>	149	2,094	4,519	21,399	30.7%
<b>2004</b>	103	2,197	3,124	24,523	35.2%
<b>2005</b>	164	2,361	4,974	29,497	40.9%

### Strategies

- Target installation of stations in counties that have the greatest need for land survey information for land transactions.

**Site evaluations for mineral resources, solid waste facilities, hazardous waste disposal and remediation**

	2002	2003	2004	2005
Geologic investigations of proposed and existing landfills	64	55	55	31
Evaluations of drinking water reservoirs	7	16	24	31
Liquid waste evaluations	369	425	451	461
Leaking storage tank investigations	11	15	17	19
Hazardous waste investigations	317	366	498	531
Gaining/losing stream determinations	68	75	93	80
Water traces	3	3	3	2
Abandoned mines/smelters investigated			900	1,165
Maps (geological, surficial materials, wellhead advisory, etc)	30	34	19	14
Publications	4	5	8	6
Paper files, maps or logs digitized or scanned	300	200	200	1,160

Objective

Maintain the number of site evaluations that meets the needs of the department or other partners asking for assistance.

Strategies

- Provide geologic assessments as to geologic suitability of existing and potential landfills to keep waste isolated from drinking water sources. This includes groundwater monitoring, assessment of gas migration and dye tracing to track contaminant movement
- Evaluate resource potential for oil, gas, coal and coalbed methane production in Missouri.
- Provide geologic support to the mineral industry in Missouri.
- Evaluate the potential in Missouri to geologically sequester carbon dioxide.
- Accelerate data automation and put mechanisms in place to keep data layers updated on at least an annual basis.

**Soil science**

Objective

Increase the number of acres analyzed as to capabilities or with updated soil mapping to 500,000 acres per year.

Number of acres surveyed, updated and analyzed			
2002	2003	2004	2005
317,000	209,580	315,656	408,773
Source: Statewide Soil Survey Initial soil survey completed in FY-02 (a 100-year project), the update began in FY-03. The spike in FY-04 reflects special projects. FY 05 indicates new levels of work need.			

#### Strategies

- Deliver an improved statewide data set, based on the Phase 1 soil survey update work by January 1, 2006. Delivery of this product will be through the National Soils Data Mart and through the Missouri Cooperative Soil Survey web site – <http://soils.missouri.edu>
- Assist districts, landowners, natural resource agencies and citizens in the use and interpretation of soils data and soils information.

## Statewide Preservation of Missouri's Significant Cultural Heritage

Historic properties protected statewide								
	1998	1999	2000	2001	2002	2003	2004	2005
Annual number of Missouri properties added to the National Register of Historic Places	25	50	61	81	43	105	67	63
Cumulative number of Missouri properties listed on the National Register of Historic Places	1,242	1,292	1,353	1,434	1,477	1,582	1,649	1,712
Number of individual resources* included within the cumulative listings of Missouri properties listed on the National Register of Historic Places	16,269	16,455	16,578	17,216	19,373	20,327	21,664	27,804
*Includes cumulative total of all historic properties identified in listings and placed on the register. This would include each historic building, site, structure and object identified in individual, group and district nominations. For example, FY 2002 showed a decline in number of properties listed, but showed a significant increase the number of individual resources included within the cumulative listings of properties due to the nomination of several large historic district during this period.								

Preserving Missouri's historic resources and cultural heritage is critical to our state's mission. It was the Mississippi River that inspired Mark Twain and the city of Marceline that served as the basis for Walt Disney's vision of Main Street Disneyland. Missouri's heritage has influenced our entire nation's culture. Therefore, it's important that it be protected for the continued enjoyment and education of future generations.

The National Register of Historic Places is the nation's honor roll of historic properties recognized by the federal government as significant at the national, state or local level. It provides a significant degree of recognition as to a property's importance. This can be a vital step leading to the property's preservation. Listing also can be a key pre-requisite for other assistance such as federal grant funding, utilization of federal or state tax incentives or assistance from the provisions of the national Historic Preservation Act of 1966. Missouri's rehabilitation tax credit is recognized as one of the most effective tools for encouraging investment in historic resources and has served as the model for numerous other states. Since fiscal year 1998, 667 rehabilitation projects have been assisted by the Missouri State Historic Tax Credit and more than \$378 million in credits has been awarded. The credits, since their inception, have triggered a total investment in the state's economy in excess of \$1.8 billion.

An estimated \$346 million is spent annually in Missouri on the rehabilitation of historic buildings and structures – defined as older buildings that might be eligible for the National Register of Historic Places. This work creates an estimated 8,060 local, good paying jobs annually.

Historic preservation in Missouri contributes slightly more than \$1 billion annually to the gross state product, according to a study completed by the Center for Urban Policy

Research, Rutgers University. The study titled “Economic Impacts of Historic Preservation in Missouri,” looked at four aspects of preservation: building rehabilitation; heritage tourism; “Main Street” programs; and historic preservation tax credits. Missouri’s annual historic rehabilitation activity generates \$70 million in total tax revenues, including \$30 million in state and local tax revenues.

Preservation protection efforts, such as listing a property on the National Register, can be an effective tool in helping to halt the decline in investment that frequently takes place in older neighborhoods. Preservation protection and recognition efforts help to promote stability in a neighborhood and promote pride in these neighborhoods. Such measures can help to give an investor the confidence that a neighborhood is on the rebound and that it is safe (or at least less risky) to make an investment in such an area. Typically such investment leads to further investment, as the area becomes more desirable.

#### Urban Cores

A growing problem is the abandonment of significant parts of our urban core areas. Traditional neighborhoods, downtown business districts and once-thriving industrial areas become stagnant and underutilized. This results in a loss of economic opportunities for the residents of these areas. This only serves to fuel the conditions leading to further abandonment. Combining historic preservation efforts with cleanup of contaminated urban land, or brownfields, will strengthen our cities.

#### Lack of Cultural Heritage Awareness

A lack of awareness and appreciation of the significance of Missouri’s historic and cultural resources continues to pose a threat to these resources. Adequate financial support for resources, particularly for important historic resources owned publicly or by not-for-profit organizations, is vitally important.

### **Technical assistance**

#### Objective

Continue to provide technical assistance to facilitate preservation of Missouri’s cultural resources and heritage and to provide sound data for the analysis and interpretation of these resources

<b>Communities aided</b>								
	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2002</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Local government assistance programs	51	61	68	101	91	117	121	146

### Strategies

- Maximize the effectiveness of the new database of archaeological and cultural sites by seeking means to fill in gaps in information and continued cooperation with all parties who can contribute to and use this information.
- Improve relationships between Missouri's tribal nations and the department. Support meetings and consultation that will lead to a more effective means of addressing Native American issues and concerns.

## **Financial assistance**

### Objective

Maintain financial assistance for the preservation of cultural resources statewide.

<b>Properties and communities aided</b>								
	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Missouri Historic Preservation Revolving Fund	10	12	16	17	16	14	13	6
Historic Preservation Tax Credits for Rehabilitation of Historic Buildings	59	153	154	208	168	317	374	373
Federal Historic Preservation Fund	11	17	17	15	14	7	3	2
Local government assistance programs	51	61	68	101	91	117	121	146

<b>Financial assistance provided</b>				
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Total applications	71	49	8	9
Projects funded	15	9	7	7
Amount requested	\$1,013,749	\$793,802	\$ 73,650	\$ 80,000
Amount awarded	\$ 235,804	\$ 98,386	\$ 66,450	\$ 68,000
Beginning in FY 04, pass-through federal funds grants have been limited to Certified Local Governments				

### Strategy

- Continue to provide financial assistance through targeting preservation needs for use of Historic Preservation Revolving Fund, such as the restoration of county courthouses. Public buildings are often overlooked or chosen last for preservation.

## **Cultural resource identification and protection**

### Objective

Continue to assist in the identification and protection of Missouri's cultural resources

<b>Number of historic properties identified and evaluated under Section 106 of National Historic Preservation Act</b>				
<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
3,547	3,251	4,914	5,099	5058



#### Strategy

- Assist state agencies to improve their stewardship responsibilities of historic properties in state ownership.